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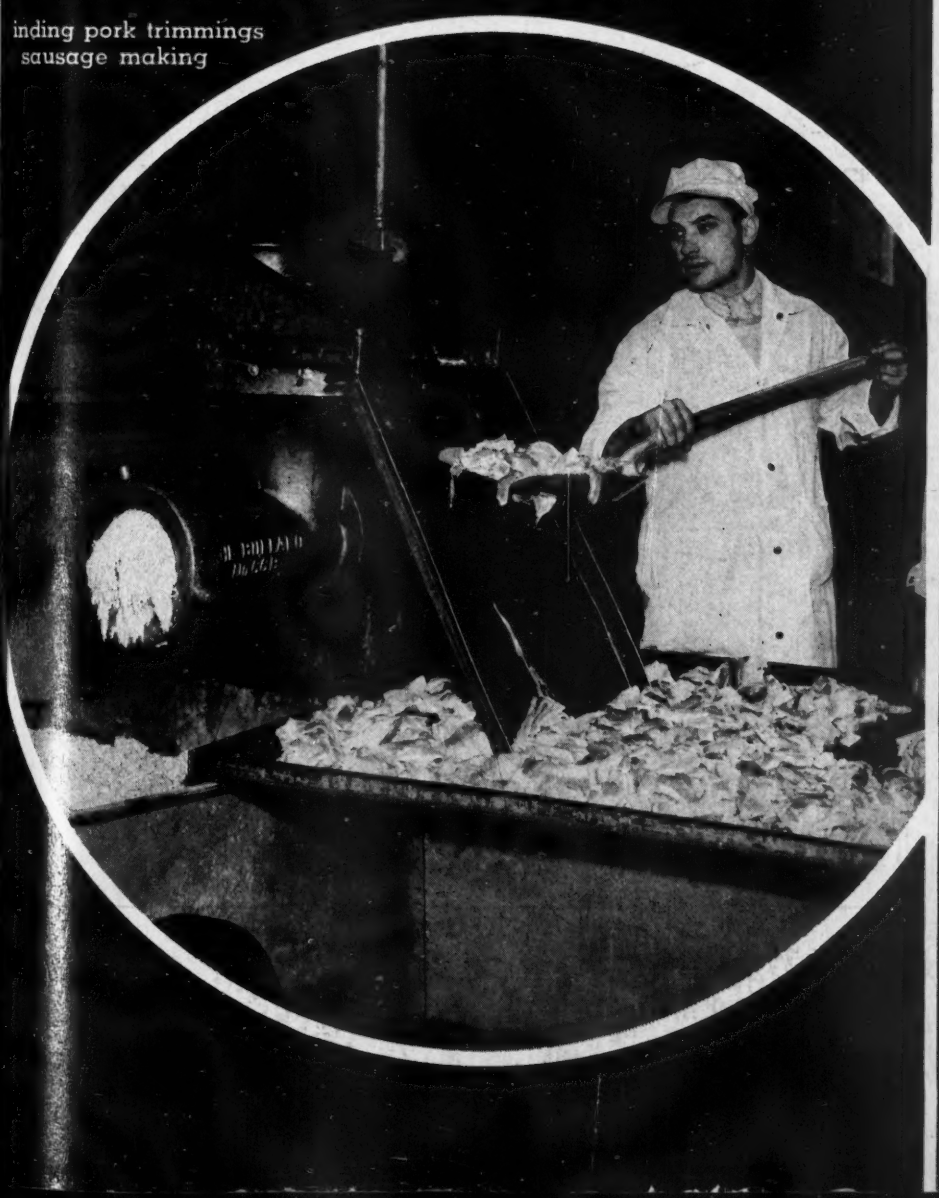

inding pork trimmings
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AUGUST 1947

Designing Sanitary Food Equipment

Versatile Unit Will Peel, Blanch, Cook

Sources and Control Of Thermophiles

Testing Pads For Sterile Filtration

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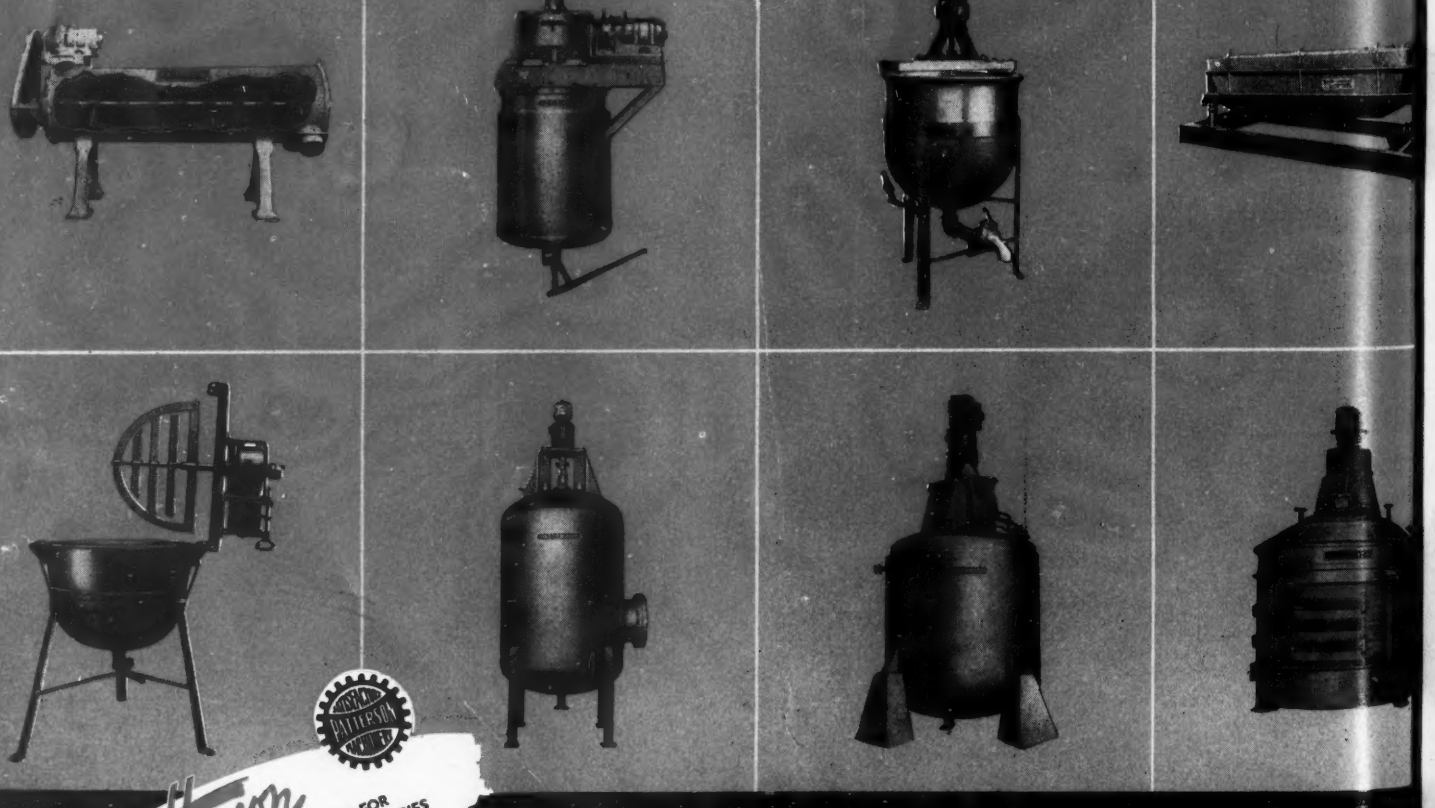

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

AUGUST, 1947 Volume 19, Number 8

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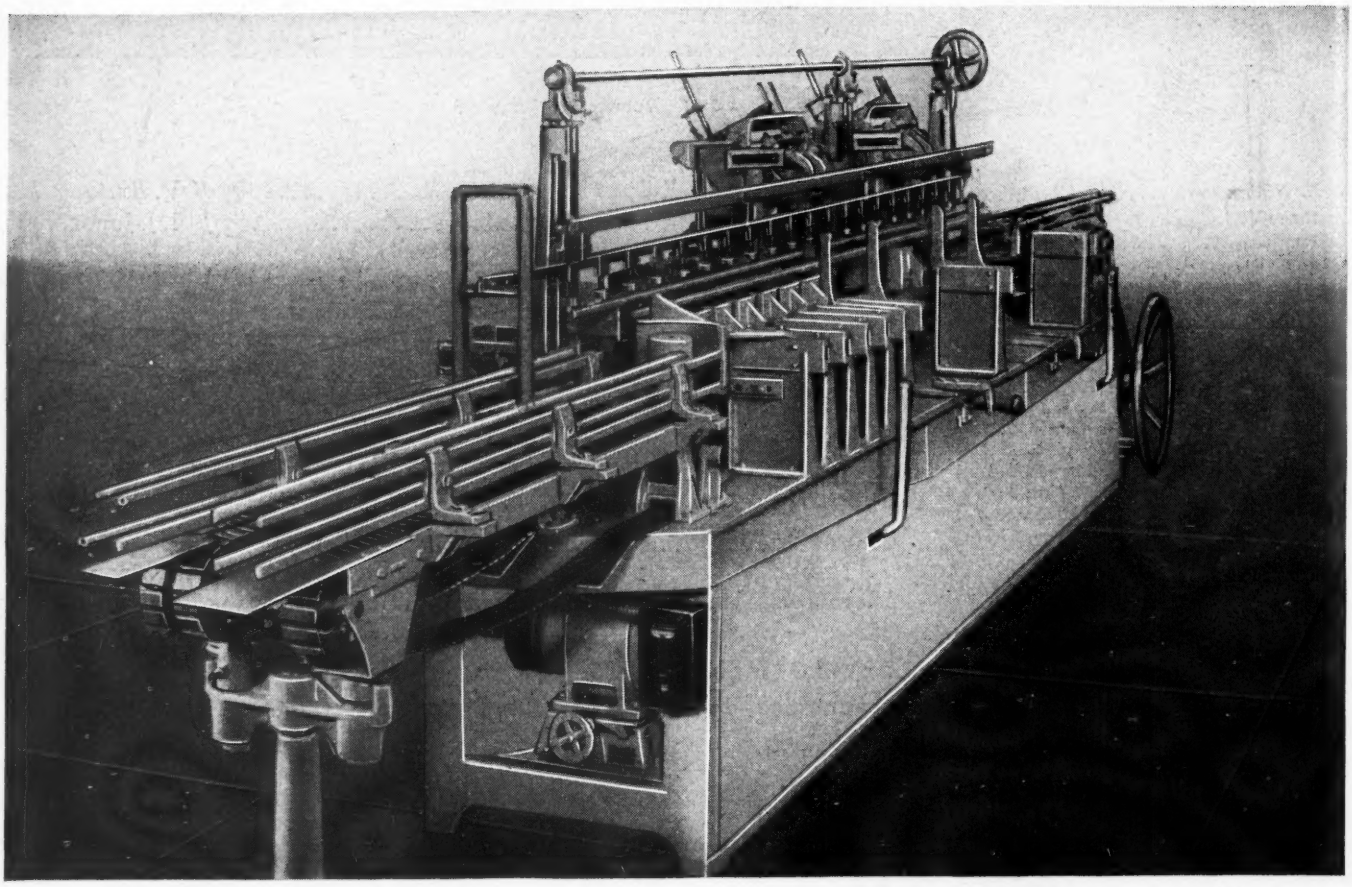

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National Labor Relations Act

THE old saying that "Sauce for the goose is sauce for the gander" has its modern counterpart in the Taft-Hartley Law, formally known as the National Labor Relations Act—also as the Labor *Management* Relations Act, 1947. After 12 years of labor excesses permitted under the predecessor law, the original National Labor Relations Act, the amendments made to the latter over the President's veto have long been overdue. But they are most distasteful to labor organizations because they tend to bring about equality of the powers and responsibilities of labor organizations and those of management.

Source of Union Displeasure

Labor unions must now operate in a gold fish bowl—to borrow a phrase from the late Hugh Johnson of NRA fame. And judging from their reactions immediately following enactment of the new law, some union officers do not enjoy the prospect. The law, however, distinguishes clearly between the worker and the organization that frequently dominates him. The officers of the unions have been more than vocal in their displeasure over their being thus singled out by law.

We may expect to see many attempts to sabotage the new law by union officers who are enraged by the restoration of equality of bargaining rights between themselves and management. It seems impossible for them to believe that, just as the chiseling employer brought on the Wagner Act, in the same way has the insatiable and unrestrained union leader brought on the Taft-Hartley version of the National Labor Relations Act to correct its previous imbalance. The recent coal contract is the first breach. It may prove fatal.

Management Must Study Law

This huge document actually requires about two entire days of solid study and note taking to go through it once. Few employers will take the time to do it so thoroughly. Hence it seems likely that many business leaders and many union leaders have merely read or heard what some one else has said about the meaning of the new law.

Therefore it is urged that the tops and all operating executives should study the law and be familiar with its many and complex provisions. Even though FOOD INDUSTRIES publishes a brief analysis of the law elsewhere in this issue, such analysis cannot be an adequate substitute for study of the law itself. Do not make the mistake of basing decisions on what someone else says the law means unless that someone happens to be your corporation attorney and really has a background of labor law.

Obligations Laid on Employer, Too

While the new law goes a long way to correct abuses permitted under the old law, the new law imposes certain obligations on the employer. If he should unwittingly fall into the error of neglecting these obligations, he may precipitate more trouble than he ever before experienced, for the union may now sue him in the courts and recover damages for violation of contracts with organized labor.

Executive opposition by organized labor to the new law is understandable; the hot heads are out on a limb from which retreat will be difficult. And it is doubtful if more than a few of the union workers have read the entire law or, having read it, realize that it can be their emancipation from the racketeering type of union. Despite the existence of many good unions that seldom get into the news, there are many that prey on their members as much as on business. Since a union must now operate under many restraints, comparable in many ways to those legally imposed on business management, as well as make known its innermost acts and expenditures—just like a business corporation—not only to the public but also to its own members; and, since a union must now face a secret ballot on many matters that may wrest from it its hold on workers, it is further understandable why the denunciations of the new law have been long and loud.

Law Must Be Made to Work

For the first time in many years management can now go to the labor conference table with reasonable equality of bargaining power. This restoration of equality, however, carries with it the moral obligation to exercise it with care. Both sides have a great deal to learn. Labor must swallow the bitter pill of realization that a part—its part—of the economy is *not* greater than the whole; management has the doubly difficult task of convincing the worker that the employer is a better friend than the outside organization.

The days of readjustment may be difficult, but if further inflation in this country is to be stopped, the new law must be made to work.

H. V. Burton

EDITOR

The Talk of the Industry

• THE high, even mounting, prices of farm land are receiving Congressional attention. Secretary Anderson has told a committee that would-be land owners cannot forever depend on high prices caused by present day food exports nor on a continuation of the good growing weather of the past eight years. Regarding weather, he spoke before the extent of crop damage from 1947 rains was known.

• HIGH costs of new construction seem to exert a form of insurance for the existing processing facilities of the food industry. New facilities cost from 50 to 100 percent more than prewar. Companies that own prewar plants are not likely to face important competition from newcomers.

• FOOD AND DRUG ADMINISTRATION is seeking an amendment to the Food, Drug and Cosmetic Act. Some recent court decisions have interpreted the existing law as meaning that F&DA has authority to seize illegal products only while they are in movement in interstate commerce—not after they have come to rest. F&DA must feel very keenly about this, for starting an amendment through Congress opens the door to more and more amendments. And, as *every* Government official knows all too well, the officially requested amendment is a pious hope that Congress often converts into something its creators would never recognize as theirs.

• IT is only a coincidence. But the striking similarity of the following figures is odd. Prof. E. M. Jellinek of Yale calculates that the number of consumers of edible alcohol in this country in 1945 was 58,250,000. The Census Bureau reports civilian employment in May 1947 was 58,330,000—an all time high.

One opines that the two figures will always roughly parallel each other, with employment taking the lead. Reason: the alcoholic stuff costs money.

• SOMEBODY told the National Fisheries Institute that there are still 370,000 retail food outlets in the U.S.A. that do not sell fish. Now it just happens that 370,000 is the number of retail grocery stores in the country, according to Commerce Department figures. It is a poorly stocked grocery that has no salmon, tuna or sardines in cans or dry salt cod in cartons. But maybe the spokesman does not consider them to be fish.

• ONE thing puzzles us greatly: What or when is a person unemployed? Certain economists are pretty free with their predictions of unemployment in the year ahead. One predicts 7,000,000 unemployed in 1948 at the low point, compared with 2,000,000 in mid-1947.

But suppose the 7,000,000 were on strike or unable to work because of strikes. According to the new concept they would not be unemployed. Yet, in our book, they would not be working.

Or suppose that 583,333 persons were continuously on strike for an entire year. The man days lost would be equivalent to 7,000,000 unemployed for a single month.

If the unemployment caused by strikes or otherwise is bunched into a short period it would probably be called a recession. If it is spread out evenly over a year it would have a less noticeable effect.

Maybe the economists ought to credit the strikes with spreading out the unemployment. And certainly the efforts of the economists to explain that the postponement of the recession is due to an unusual increase in consumer purchases suggests that we are not alone in our confusion.

Hors d'Oeuvres

• Pathfinder's business bulletin headlines a news item with "Mirrors Can Give Pleasing Effects." Trouble is the darn things just aren't consistent.

• *Thirty Guatemalan turkeys have been imported by a Pennsylvania scientist, in order to establish the breed in this country, The American Magazine tells us. They are smaller, more brilliantly colored than native gobblers. The size might be an advantage, but light and dark are still the only colors required.*

• Domestic honey production is down 60 percent from last year. Can it be that the queen bees are having labor troubles, too.

• *Passion fruit, mango, guava and avocado are among the new ice cream flavors appearing on some markets. You can still get vanilla, but you may have to stare down some raised eyebrows to do it.*

• Continuous process butter is the first new butter making process since 2,500 B. C., according to the Farm Journal. When the butter people invent a process, they make it to last a while.

• *Not to be outdone, the herring fishermen in England have been told that they are fishing for margarine. In fact, margarine from herring oil is becoming a big industry. This gets close to justifying USDA in classifying fishermen as farmers.*

• The Can Manufacturers Institute reports a factory in Illinois that is turning out handles that clip into tin cans. The empty can thus becomes a drinking mug. It might be best to toughen up the lip before getting too enthusiastic about this.

• *Now that the pickle packers have coined a term for their quick packed pickle, we learn that one who bogs down after two drinks is quickled.*

• After announcing that corncobs were to be utilized in making nylons, DuPonts apparently got worried. So they followed up with an explanation that corncobs were just ONE of the raw materials used in the manufacture of adiponitrile, which is just ONE of the chemicals that go into nylon. So nylons will still be sold by the pair, not the bushel.

• *Sunkist is going after a share of what they claim to be an $85,000,000 annual business. Their program seems to be quick and easy. All they do is feature lemons as a laxative.*

• The American Dairy Association tells us "the humble dairy cow manufactures a product no scientist has ever duplicated, even in this fantastic atomic age. Her product is milk." That's the way we like to see things written—none of this mystery and suspense stuff.

• *The National Dairy Council says that a 26 month research study at the U. of Illinois proved that the adolescent boy needs plenty of food whenever he gets hungry. You mean it isn't a tapeworm, after all?*

J.A.J.J.

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SHORT TITLE AND DECLARATION OF POLICY

SECTION 1. (a) This Act may be cited as the "Labor Management Relations Act, 1947".

(b) Industrial strife which interferes with the normal flow of commerce and with the full production of articles and commodities for commerce, can be avoided or substantially minimized if employers, employees, and labor organizations each recognize under law one another's legitimate rights in their relations with each other, and above all recognize under law that neither party has any right in its relations with any other to engage in acts or practices which jeopardize the public health, safety, or interest.

It is the purpose and policy of this Act, in order to

The New Labor Law

The Taft-Hartley bill marks at least a start toward better labor-management relations, which, in many ways, are most vital to the food industry

By J. A. J. JONES, Assistant Editor, "Food Industries"

HAVING survived the first repercussions that followed passage of the Taft-Hartley Labor Management Relations Act, American industry took a longer, less emotional view of the bill during the past month. What they found caused many to wonder what had generated all the heat that preceded and immediately followed the enactment.

Unquestionably the wings of labor's leaders have been clipped, but the bill greatly increases the protection afforded the individual worker as well as his employer. Proponents of the new law admit that many of its provisions offer a wide target to anyone anxious to engage in sharp shooting. The intent of Congress, however, is nowhere so apparent as in Title IV of the Act, which creates a joint congressional committee with wide powers, to make a thorough study of the entire field of labor relations, including seven stipulated aspects of labor-management welfare. The committee is to report to Congress not later than next March 15, making such recommendations as it may deem advisable. A final report is to be made not later than Jan. 2, 1949.

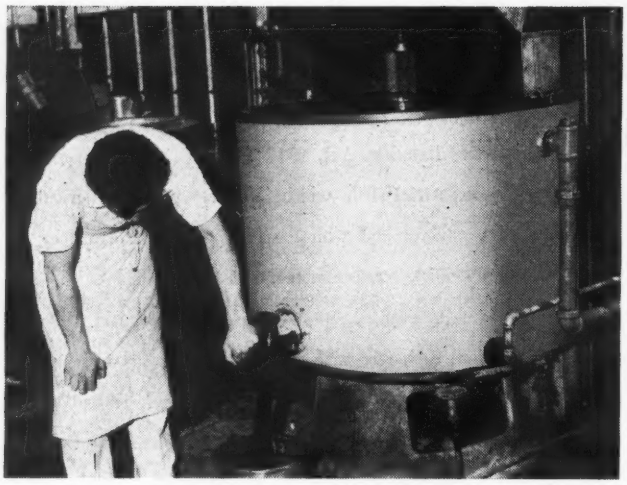
One of the more plausible objections to this Act is the fear that it will result in litigation and possible unrest among minority labor groups. It will do all of that just as the Wagner Act has done and for substantially the same reasons; the reluctance of the favored group to give up any of its prerogatives regardless of the inequities they create. One certainly contentious provision is the reversal of a practice recognized in all old time standard contracts. An employer may not now be forced or required to assign particular work to employees in a particular labor organization or in a particular trade, craft or class rather than employees in another labor organization, trade or craft. "Featherbedding" is also prohibited in the new law.

Professionals Protected

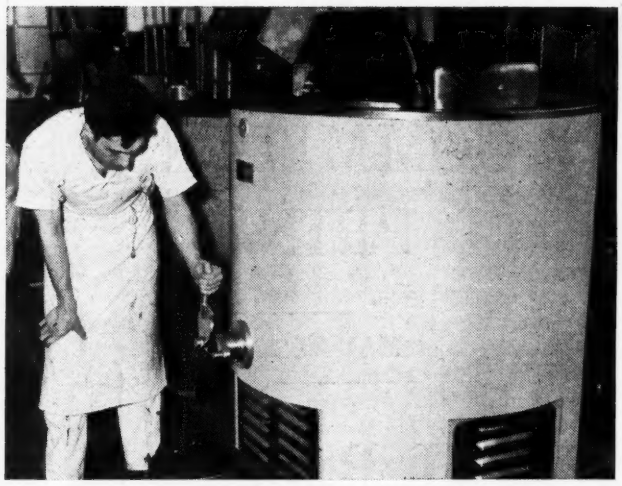
Of particular interest to the food industry is the protection afforded *professional* employees. This group is well defined in the Act and may not be represented by any unit for purposes of bargaining unless a majority of the group has voted in favor of such inclusion. This means that the professional group will not be swallowed up in a general vote of plant employees. Another provision appears to be aimed at the abuses inflicted by the Teamsters' and Fishermen's Unions in recent years. This makes it unlawful to require "any employer or self-employed person to join any labor or employer organization or any employer or other person to cease using, selling, handling, transporting, or otherwise dealing in the products of any other producer, processor or manufacturer." The Act further rules out secondary and jurisdictional strikes.

While the closed shop and the so-called Class B union memberships are banned in the new bill, the union shop is maintained. Deductions of union dues from wages, however, may only be done when the employer has received from

(*Continued on page* 200)



ORDINARY KETTLE for melting and tempering chocolate has many defects. It is difficult to clean and disassemble.



NEW KETTLE has many sanitary features. All surfaces in product zone are accessible for cleaning and inspection.

Designing And Constructing

New chocolate kettle overcomes sanitary defects of conventional ones. It

By JEROME FEINER
New York City

SANITARY features predominate in a newly designed chocolate melting and tempering kettle which has been unconditionally accepted by the New York City Department of Health. The new kettle is suitable for use in many branches of the food industry.

Slow progress in the improvement in the sanitation of food processing equipment is due in part to engineering difficulties encountered in designing and manufacturing new food equipment. Requirements of sanitation and productive efficiency impose new problems that can be solved, however, by ingenuity and innovation. The new kettle is an example of the overcoming of these difficulties by food manufacturers and equipment makers, in cooperation with regulatory officials.

Sanitary Features

Food processing equipment must conform to certain accepted standards of sanitary construction. These are exemplified in the new chocolate kettle. It can be thoroughly cleaned. All surfaces in the product zone are polished, corrosion-resistant and free from rough spots, crevices and seams. The agitator is polished cast aluminum. The kettle body and scraper blades are polished stainless steel. There are no sharp corners. Where conventional kettles have sharp corners —at the junction of the bottom with sidewalls and center column—this kettle has long radius curves.

There are no stuffing boxes or glands in which chocolate might accumulate and decompose. The center column, made integral with the bottom of the kettle, encloses the agitator drive shaft, bearings and other parts of the power transmission. The agitator connects to the drive shaft at the top of the center column, well above the level of chocolate when the kettle is filled to capacity (150 gal.—or 1200 lb. —of chocolate). A sealed bearing at the top of the drive spindle eliminates contact of lubricating grease with product.

Easy to Clean

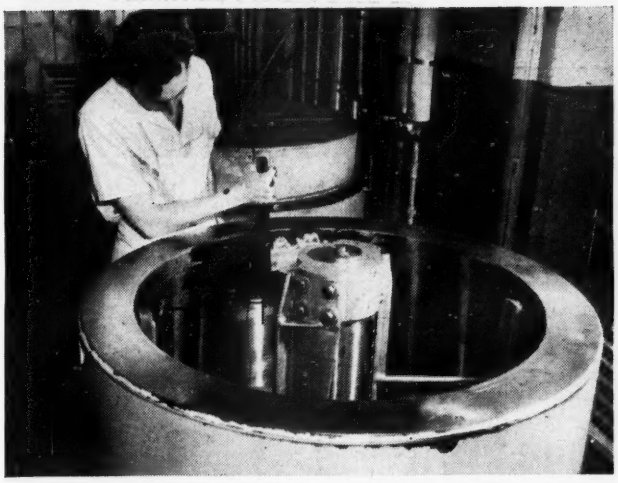
All surfaces in the product zone are accessible for cleaning and inspection. The agitator, including the scraper blade assembly, can be detached from the drive spindle by removing one nut. The light weight of the aluminum agitator makes it easy to lift out of the kettle and easy to handle for cleaning. Scraper blades are removed from the agitator by sliding them out of slots. These slots are large enough to permit brushing all surfaces during cleaning. The sanitary, stainless steel, chocolate drain valve is disassembled by the removal of one nut. By the removal of the two nuts mentioned, all parts can be made accessible for cleaning.

Two other features add to the cleanliness of this kettle. One is the removable stainless steel sectional cover which is free from seams, hinges, crevices and beads in which dirt might gather. Heavy gage stainless steel stock provides sufficient rigidity without beading. The other feature is the smooth white kettle housing which also encloses the transmission and motor. These are accessible for maintenance by removing the ventilator covers on the kettle housing. To facilitate cleaning, the entire unit is elevated above the floor, on four legs adjustable for leveling.

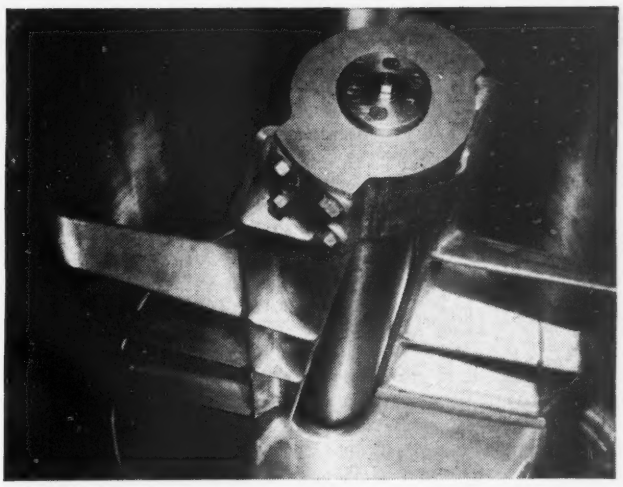
Cooperative Effort

Development of the new kettle was due to the combined efforts of the Wegner Machinery Corp., the engineering departments of Barricini's Candies and Loft Candy Corp. and officials of the New York City Department of Health.

Barricini's Candies was interested in replacing their ordinary chocolate kettles in 1946 with new ones that could be kept scrupulously clean. Chocolate kettles meeting the sanitary requirements of the New York City Department of Health were not available at that time. The Barricini organization brought their problem to the Wegner Machinery Corp. The machinery manufacturer became interested in the problem, even though they had never manufactured food processing equipment. Once the Wegner



COVER of kettle is easy to remove. It is free from seams, hinges, beads and crevices in which dirt may gather.



INTERIOR of new kettle showing polished cast aluminum agitator and stainless steel body and scraper blades.

Sanitary Food Equipment

is efficient, easy to clean and useful for processing a variety of foods

Machinery Corp. undertook to manufacture this kettle, it assumed the initiative in obtaining the necessary information and advice, perfecting the sanitary design, and fabricating the new kettle.

Conventional Kettle Defects

The new kettle was designed to overcome the sanitary defects of conventional chocolate kettles. Under the usual conditions prevailing in candy factories, it is practically impossible to keep ordinary melting kettles clean. The linings are usually made of cast iron, and are subject to rusting. If they are washed with a detergent solution, it is necessary to dry all parts immediately after washing, and protect all the surfaces with a film of cocoa butter. Furthermore, the interior of the kettle is usually roughened and scored by wear. This condition, coupled with the sharp corners where the bottom of the kettle joins the sides, adds to the difficulty of keeping these kettles clean.

The ordinary cast iron agitators are heavy and cumbersome. It requires the services of a mechanic, aided by several porters, to remove the agitator from a single kettle, disassemble it, clean it, and replace it. This job might take several days. Such agitators are constructed with many dead end holes, crevices and joints which cannot be brushed clean, and as a result a residue of chocolate always remains in these inaccessible places where it eventually decomposes and turns rancid. The draw-off valves have similar defects.

Since it is so difficult, time-consuming and expensive to clean these kettles, they are generally drained, scraped, and coated with fresh cocoa butter at infrequent intervals. The parts are not disassembled for cleaning, and not washed with a detergent solution.

One other common defect of such kettles is that machine grease—from the agitator drive shaft—usually works its way into the melted chocolate.

Improving the Kettle

The first step in improving the kettle was to incorporate all the recommendations into an acceptable design. This was accomplished in a series of meetings of the interested parties in which preliminary designs were studied and criticized. Suggested modifications were incorporated into succeeding sketches until a design and specifications were acceptable to the candy factory operators and the Health Department.

The second step was to break down the overall design into detail sketches of each component. These sketches were submitted to the same group for further criticism and modification. Then the working plans were drawn.

To merit acceptance by food manufacturers, new machines must be more efficient than the equipment to be replaced. Engineering innovations in this kettle result in a significant gain in productivity due to accelerated heat transfer. As a result, chocolate can be melted and tempered much more rapidly than in the conventional iron kettles.

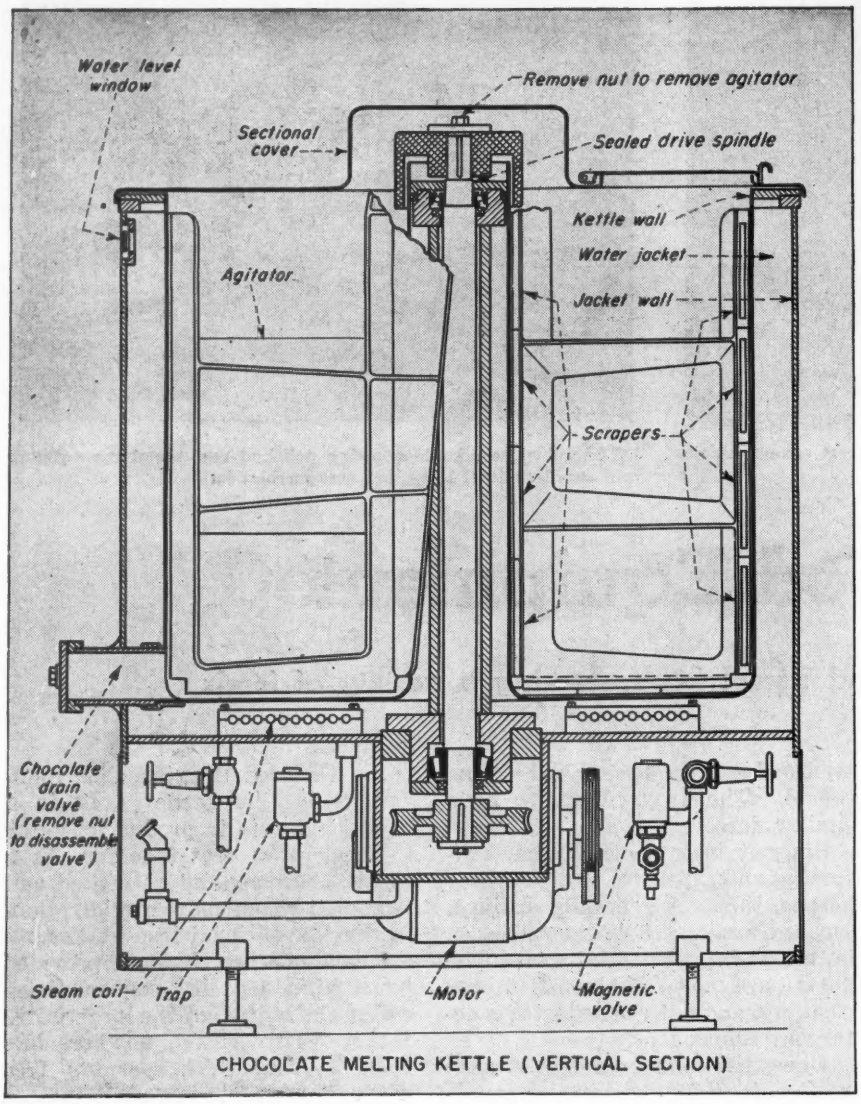
When melting, heat is provided by a high capacity copper steam coil in the bottom of the large water jacket. This jacket, nowhere less than 3½ in. thick, permits free convection circulation of the heated water. The water temperature is controlled by a thermostat, set for melting or tempering. The water jacket covers not only the sides of the kettle, but also the central column and the bottom of the kettle. This provides greatly increased heat transfer surface. The kettle wall, of stainless steel, is thinner and a better heat conductor than a cast iron kettle. Consequently, it adds considerably to the rate of heat transfer. Heat transfer is further accelerated by thorough scraping of the walls, bottom and central column.

Several innovations deserve special mention:

1. The kettle is supported within the water jacket by a series of bosses, designed to minimize distortion without impeding convection circulation of the water.

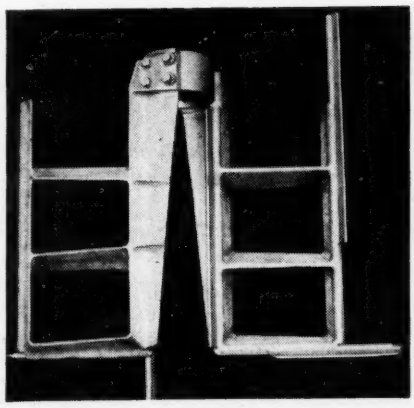
2. The scraper blades are self-aligning. When slotted into the agitator, each blade forms a free-swinging hinge that compensates for variations in the diameter of the

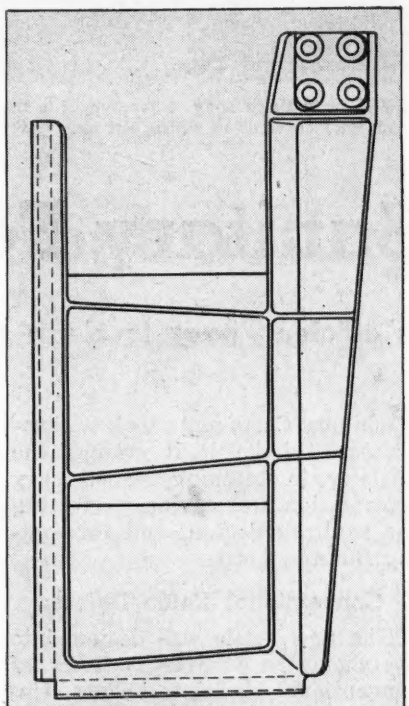
Kettle Parts Are Easily Removed for Cleaning



CHOCOLATE MELTING KETTLE (VERTICAL SECTION)

VERTICAL SECTION showing chocolate drain valve, outer jacket, water jacket area including bottom and central column, shape of kettle, sectional cover, agitator, scrapers, sealed drive spindle, steam coil, and thermostatic control valve.




ALUMINUM AGITATOR ARM

AGITATOR and scraper blades (top). Blades, first solid, were cut in four to hinge on arm (bottom).

kettle. They are set at an angle to the kettle surfaces. When the agitator is rotating, the chocolate presses them firmly against the side of the kettle lining.

3. The scraper blades are designed to minimize the effect of any irregularities in the surface of the kettle.

Self-Aligning

Each vertical scraper (for the sidewall and central column) consists of four separate blades. Each bottom scraper is made of three separate blades. Each individual blade aligns itself independently of the others by contact with the kettle. These design features assure complete removal of the chocolate from the sidewalls, bottom, and central column. Thorough scraping eliminates the insulating effect of the layer of solidified chocolate which is so commonly found adhering to the inner walls of ordinary kettles.

To eliminate the likelihood of scoring and roughening the polished kettle surfaces, the scraper blades are made of a stainless steel alloy slightly less hard than the kettle body.

Thorough Agitation

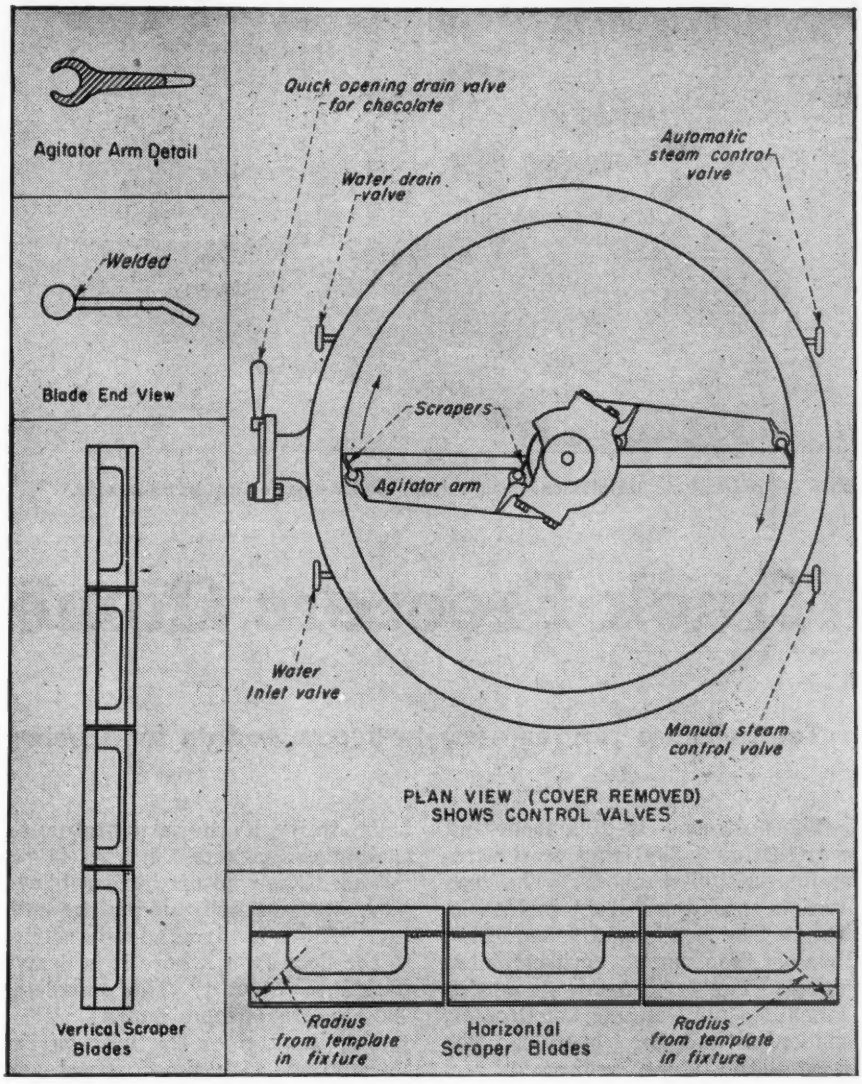
The final factor responsible for the extraordinary rate of melting is thorough agitation. The agitator is designed to provide thorough continuous mixing not only during melting, but also when the tempered chocolates becomes viscous. An efficient power transmission, equipped with anti-friction bearings, provides adequate power for agitation without overloading the 2 hp. motor with which the kettle is equipped.

The same factors responsible for rapid melting serve to bring about rapid tempering. Melted chocolate is cooled promptly to tempering temperature by running cold water into the jacket. The thermostat is then set to maintain the desired tempering temperature. Due to rapid removal of the heat of fusion (generated by the formation of fat crystals in the chocolate during tempering) this process can be completed in a fraction of the usual time.

Engineering Problems

Fabricating a kettle of the required shape from heavy gage stainless steel presented unforeseen difficulties. The kettle had to conform to close tolerances. The design called for long radius curves at the bottom of the kettle, and at the insertion of the chocolate drain valve. Conventional steel working machin-

Stainless Scraper Blades Fit in Grooves



SLOTS in arms (top) holds scraper blade sections. **PLAN shows hinge action of vertical scraper blades which adapt themselves to irregularities in the kettle lining. Bottom scrapers are shown in lower drawing.**

ery and methods could not shape this kettle. Problems involved in fabricating the kettle were solved by specialists in this field, who had the necessary stress-relieving furnaces, and the needed skill and experience in drawing and welding stainless steel.

Complex Design

Other engineering problems were encountered in designing the agitator and scraper assembly. The design had to afford compensation for variations in the diameter of the kettle due to irregularities, distortion and expansion. A corollary problem was the construction of the kettle housing with a large water jacket, free convection circulation, and with a supporting structure for the kettle which would minimize distortion and irregularities in kettle curvature.

Engineering ingenuity was also needed: (1) To eliminate scoring and roughening of the kettle walls which might have resulted from positive contact with scraper blades; (2) to construct a lightweight agitator; (3) to design a sanitary, leakproof, chocolate drain valve; (4) to eliminate stuffing boxes and glands; (5) to increase the heat transfer area and (6) to design and fabricate a stainless steel sectional cover so that it would be free from hinges, beads and other sanitary defects found in covers for conventional kettles.

Proven Success

As in the case of all newly designed equipment, the ultimate test of the completed kettle is how well it functions in the food factory. The production manager of Barricini's Candies called it the best kettle he ever saw. He said: "It does the work of a battery of kettles. It is easy to clean. One man can take out the agitator in a minute. He can handle the agitator without straining. The blades just fall out when the agitator is turned over. This kettle is easy to clean, so we keep it clean."

Higher Productivity

High productivity of this kettle is indicated by the following data reported by the production manager of Barricini's Candies: Using chocolate in the form of 10 lb. blocks, and with the water jacket maintained at only 120 deg. F., a batch of 1200 lb. of chocolate can be melted in less than one hour. The melted batch can be cooled to 90 deg. F., and tempered within one-half hour. Four 1200 lb. batches of chocolate can be melted and tempered during an eight hour working period. Where tempering of the chocolate is unnecessary, six 1200 lb. batches of melted chocolate can be produced in the same period of time.

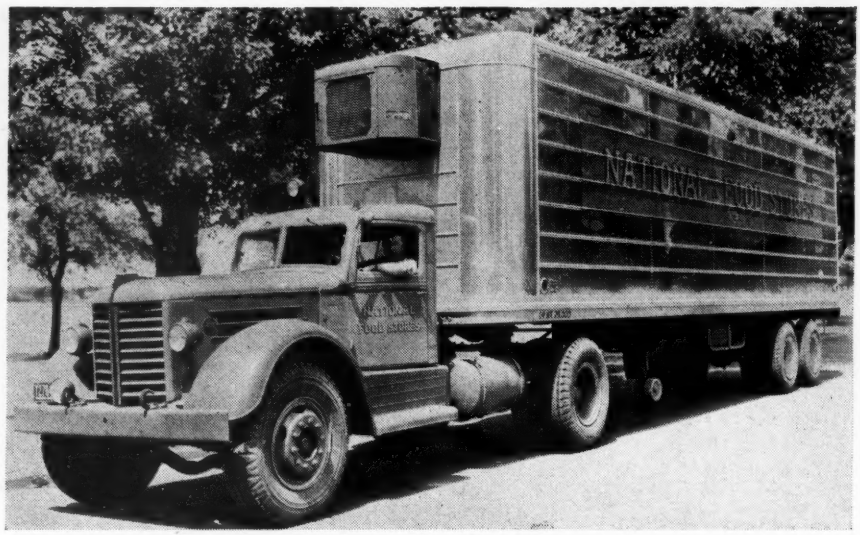
Other Uses for the Kettle

This kettle can be used for processing other foods. It is valuable for foods now processed in kettles which can not be thoroughly cleaned. In addition, the new kettle offers advantages of accelerated heat transfer and controlled jacket temperatures.

It has been suggested for the manufacture of process cheese. It is probable that the flavor of process cheese would be materially improved through rapid melting with low jacket temperatures. This would conserve the desirable volatile flavors now lost through overheating. In the manufacture of custard filling for baked goods, dangers of staphylococcus food poisoning could be minimized. This could be accomplished through prolonged cooking at high temperatures, followed by rapid cooling.

Other possible uses include: (1) Rapid thawing of frozen eggs in bakeries, salad dressing and mayonnaise plants and macaroni factories; (2) thawing frozen fruits in bakeries and ice cream factories; (3) cooling jams, jellies and preserves; (4) cooking and cooling various types of pie fillings and (5) melting chicle.

Where high jacket temperatures are required, as in the melting of chicle, the new kettle can be adapted for such work by using a high temperature heat convection fluid such as Dow-therm in place of water, in the jacket.



EASY TO SHIP and easy to mount. Only four bolts are used in the installation, though some reinforcements may be necessary.

Truck Freezers Come

Temperature ranges vary to accommodate food being

FOOD companies shipping perishables in their own vehicles now have available a nationally-distributed line of mechanical refrigeration units, factory-packaged and ready for installation on trucks or trailers, to protect high range dairy products and meats or low range frozen foods and ice cream. The units are known as the Thermo King and are manufactured by the U. S. Thermo Control Co., Minneapolis.

All of the units come in a rectangular box-like form, approximately 2 ft. wide, 2 ft. high and 4 ft. long. Each is inserted in the front end of the body above the top of the cab, in the case of trucks, and in the nose of the body above the tractor cab on trailers.

Cut Opening

To make the installation, a rectangular opening, to suit the size of the particular model being used, is cut into the front of the vehicle body and a metal sill provided on the bottom of the opening. The unit is then inserted and fastened to the body by four bolts.

Where structural reinforcement is required to support the units, which vary from 500 to 800 lb. according to size, metal or wood uprights are installed and joined to the top and bottom structure of the body.

The unit consists of a front and rear section. The front section remains outside the body. The rear section extends entirely inside the body. The sections are separated by a transverse cork-insulated shield. The front section contains a small gasoline engine, compressor, condenser and the controls. The rear section has a cooling coil and a blower.

Separate Power

In operation the Thermo King is similar to standard commercial units. Power for the unit is supplied by the gasoline engine, which drives the compressor and fans. There is no connection between the Thermo King unit and the truck engine.

All of the components of the Thermo King unit are housed in this two-section, single box-like frame except that, in some models, the fuel gasoline tank and battery box are placed separately at a convenient position. The opening in the body should be placed so that the rearmost section, inserted inside the body, will be as close as possible to the inside ceiling. Such a location provides for a better circulation of the cooling air inside the body.

The air circulation follows standard commercial practice. Air is drawn from the truck or trailer body through the evaporator or cooling coil, where the heat is removed. The cold air is then blown back into the body under the ceiling. The cold air gradually settles to the floor from where it is drawn back into the unit. This completes the air circulation circuit.

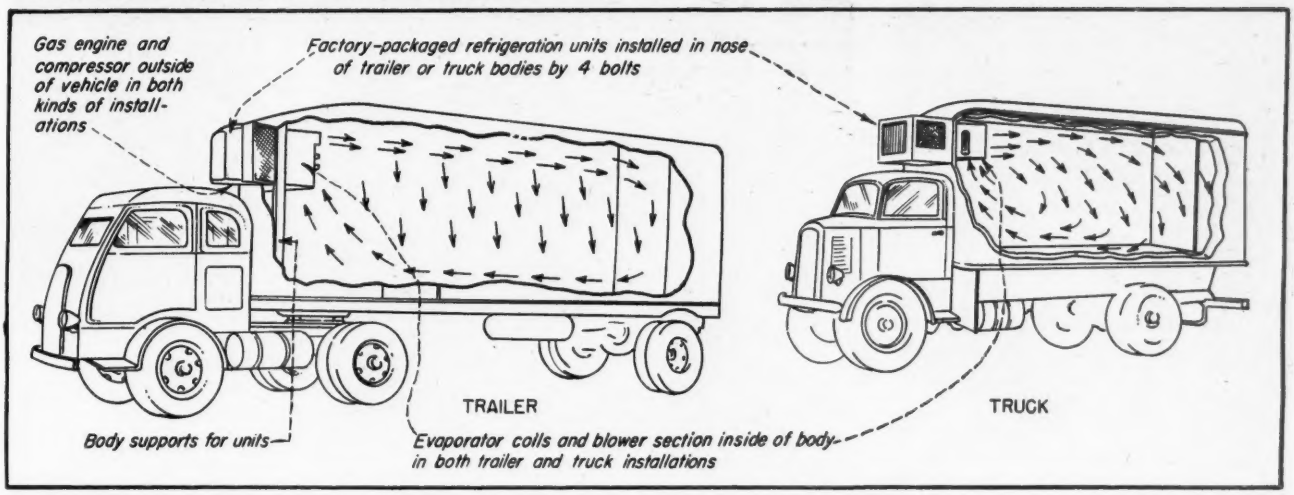
The location of the unit on the body front with the forward section entirely outside, helps to reduce the volume of the inside body loading space occupied by the unit.

Proper Insulation

Adequate body insulation must be provided for the most economical operation of the Thermo King units. The required thickness of insulation is dependent upon the products to be carried. For foods such as dairy products and meats, which can be carried safely in the higher temperature range, 3 in. of insulation are usually sufficient. For products such as frozen foods and ice cream, on the other hand, 5 or 6 in. of insulation are necessary. It is most important that the floor, too, be properly insulated.

Other important insulation requirements, to obtain the greatest efficiency of the Thermo King units, include a body construction in which there is no metal-to-metal contact between the inner and outer surfaces of the body. The body should also be fitted with side rails

Vehicle Bodies Must Be Insulated to Gain Full Advantages


Gas engine and compressor outside of vehicle in both kinds of installations
Factory-packaged refrigeration units installed in nose of trailer or truck bodies by 4 bolts
TRAILER
TRUCK
Body supports for units
Evaporator coils and blower section inside of body in both trailer and truck installations

POWER is supplied for truck and tractor models by a two-cylinder gasoline motor, operating independently of engine.

Ready For Installation

transported but all are thermostatically controlled

and floor slats, which will prevent the loading of the cargo against the walls and floor. This will permit the cooling air to be circulated completely around the load.

Maintenance Temperature

The Thermo King units are not designed to refrigerate the products down to the temperature at which they are to be maintained during the haul. It will, however, keep them at the required temperature if pre-cooled to that temperature before loading. The units are made in two general classifications, one for straight trucks, and one for trailers capable of carrying larger loads. One or more models are available in each classification to provide for high or low range refrigeration, or other special conditions.

Units designated as Model E are designed for straight trucks or small trailers. Model D units are for larger trailers.

Both Models D and E are fully automatic in operation. Before the unit is started, the operator adjusts the thermostat to the desired temperature for the haul. The engine will operate until the desired temperature is reached and will then stop automatically. When the temperature in the body rises a few degrees, the engine starts again.

Model E units can be installed in any insulated truck body having at least 18 in. of space between the inside ceiling and the top of the cab. Where such space is not available, the top front section of the body may be raised a few inches.

When the Model E unit is installed on a straight truck, the fuel for the unit is drawn from the truck's regular gasoline tank. When installed on a small trailer, a separate fuel tank is provided on the trailer. With 6 in. of body insulation, the Model E units will maintain the temperature of precooled loads as low as –11 deg.

Shift to Heating

Four Model D units are available. One is designed to provide the low range temperatures for frozen foods and ice cream. Another provides high temperature ranges for dairy products and meats. A third unit is designed to provide heating as well as cooling service. The heating is thermostatically controlled and the operation is automatic. To change from cooling to heating the two side screens of the unit are replaced with solid panels.

All three of the above units are powered by a two-cylinder gasoline engine equipped with a 12-volt starter-generator, mounted on the crankshaft. The compressor is a four-cylinder V type. A separate 15-gal. fuel tank is supplied for installation on the trailer. The unit weighs 755 lb. The size of the opening in the trailer body is 25¾ in. wide and 23¾ in. high.

The fourth Model D unit is powered by an electric motor. This unit can be used for stationary or semi-stationary installations.

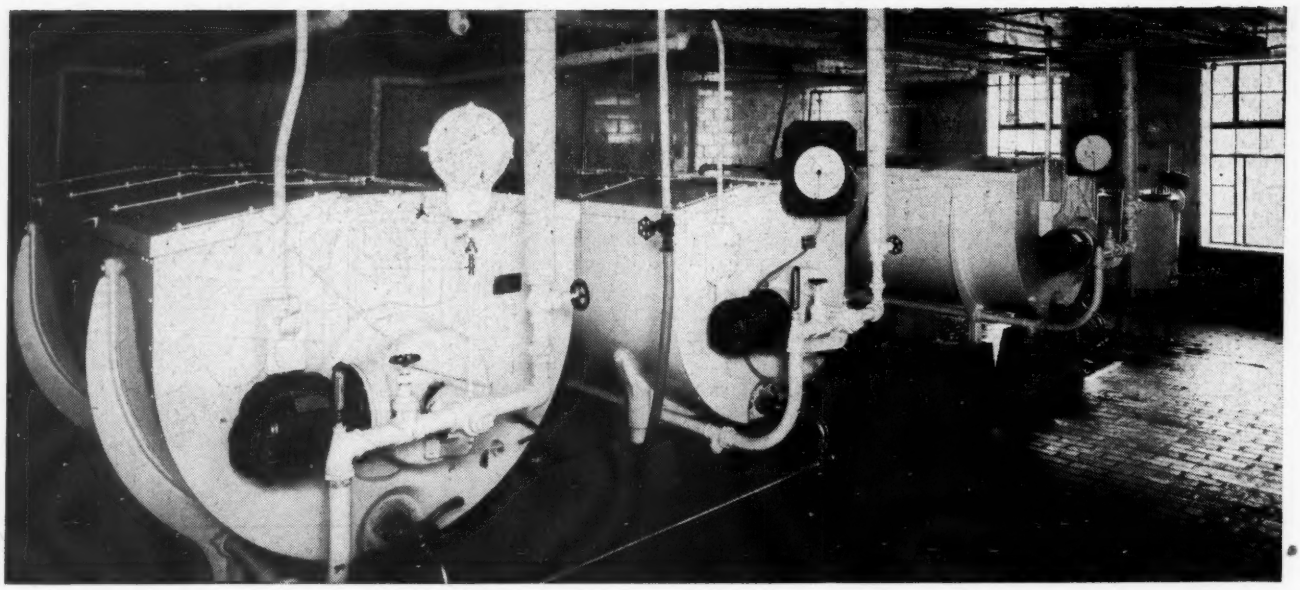
Semi Automatic

One model, designated as CM, is semi-automatic in operation. In this model the engine does not stop when the desired temperature is reached. Instead, a modulating device cuts the speed to idling.

The CM unit is recommended for installation in middle-size trailers, where the higher temperature ranges are to be maintained. The unit may also be used in straight truck bodies, which have at least 27 in. of space between the inside ceiling and the top of the cab.

In all three Model D, E and CM units, defrosting is accomplished by turning a switch, which causes the hot refrigerant gas to flow through the evaporator coil.

The change from cooling to heating units is often made by wholesale grocers, who have to distribute fresh fruits and vegetables all year round. The cooling unit is employed in the summer to keep them fresh. In winter, by changing the cooling unit to a heating one, the fruits and vegetables are kept from freezing.

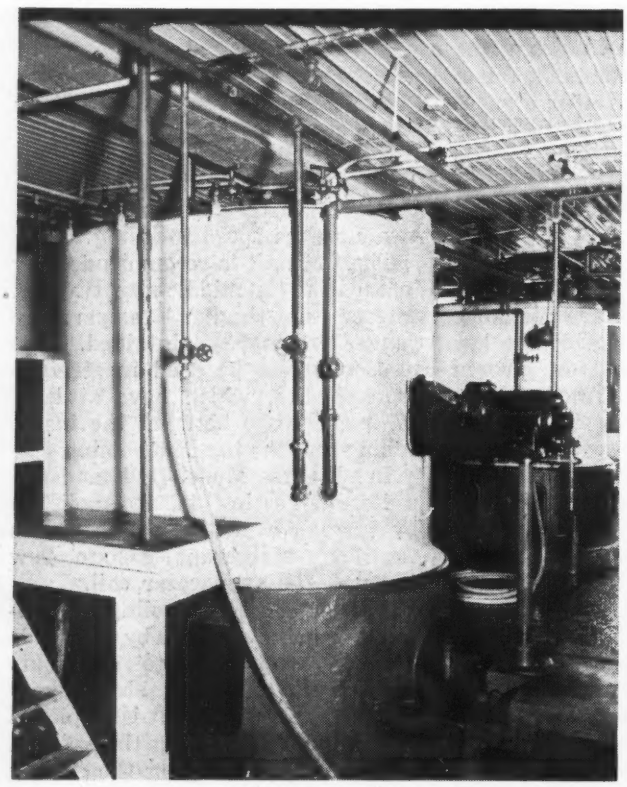


1 CHURNGOLD's milk culture tanks, each of which has a capacity of 600 gallons. In these tanks culture is added to the skim milk at a temperature of 70 deg. F. After a holding period of 10 to 14 hours at this temperature the milk is cooled to 40 deg. F. and transferred to a 2,000 gal. storage tank. Mother culture, used to seed each day's run, is made in the small tank.

Churngold Margarine Made by Continuous Process

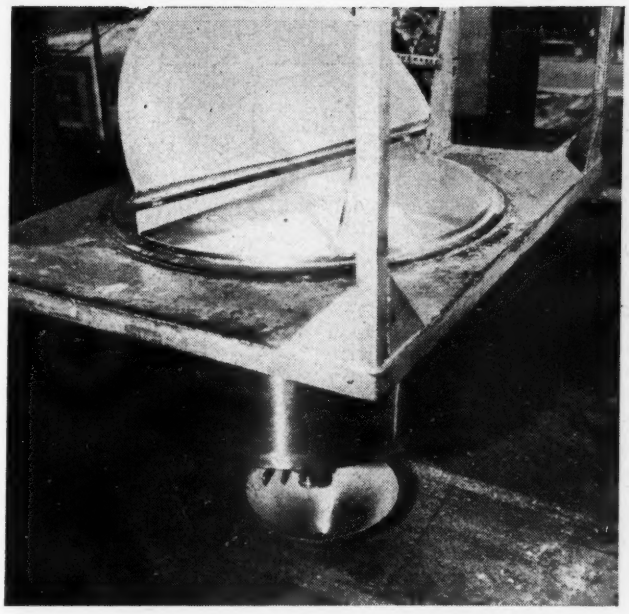
Adaptation of equipment, originally designed for continuous ice cream manufacture, to margarine production triples production—halves labor

By J. E. SLAUGHTER, JR., The Girdler Corporation, Louisville, Ky.

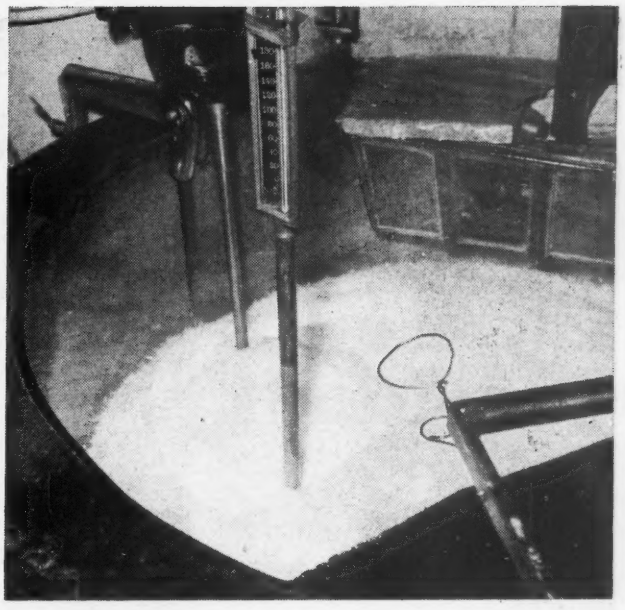


4. TWO CHURNS are used in blending the prepared skim milk and oils into an emulsion. The emulsion is held at 110 deg. F.

5. TWO TANKS, each with a capacity of 2,500-lb., hold the emulsion until it is pumped to the continuous production line.



2. CULTURED MILK for each 2,500-lb. batch is weighed into a weigh tank equipped with a mixer. Salt, benzoate of soda, diacetyl, and an emulsifier are added and mixed.



3. THE NEXT STEP is to weigh out into this tank the amount of vegetable oil required for each 2,500-lb. batch, to which the oil soluble ingredients—lecithin and vitamin A—are added.

MARGARINE is made from pasteurized skim milk and domestic vegetable oils—and virtually all of it is fortified with a minimum of 9,000 USP units of vitamin A the year round. Margarine ordinarily contains a minimum of 80 percent fat, approximately 16 percent moisture, 1 percent non-fat milk solids and 3 percent salt. It has a caloric value of between 3,200 and 3,300 per pound.

From the time it was first produced by the French chemist Mege-Mouriez in 1870, all margarine until recently was made in batches by the "wet" method. The continuous process now in general use is regarded as the greatest single contribution to efficient production in this field, and has made the former process obsolete and economically unsound. A modern, continuous plant can process three times as much margarine with half the labor of any older manufacturing procedure.

Votator Used

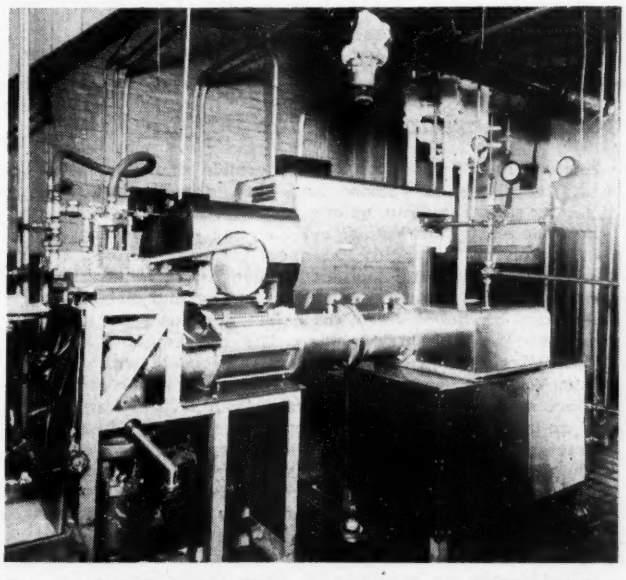
One method of continuous production employs the Votator. This is a continuous, closed, heat transfer mechanism that simultaneously mixes and chills, and delivers the finished product under pressure to the molding apparatus, ready for packaging.

Its basic feature is its processing tube assembly, which provides a high ratio of surface to volume. Through the tube's center is a rapidly revolving mutator shaft equipped with scraper blades which keep the heat transfer surface clean, thus preventing an insulating film from building up.

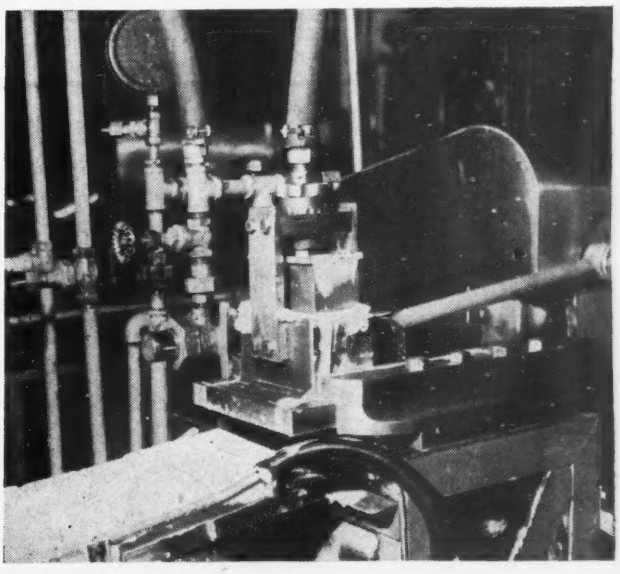
The refrigerant, usually liquid ammonia, is circulated around the processing tube through which the fat and skim milk emulsion passes. The annular space holding the refrigerant is enclosed within a metal jacket. This jacket is surrounded by a thick layer of insulation and a metal cover.

The Process

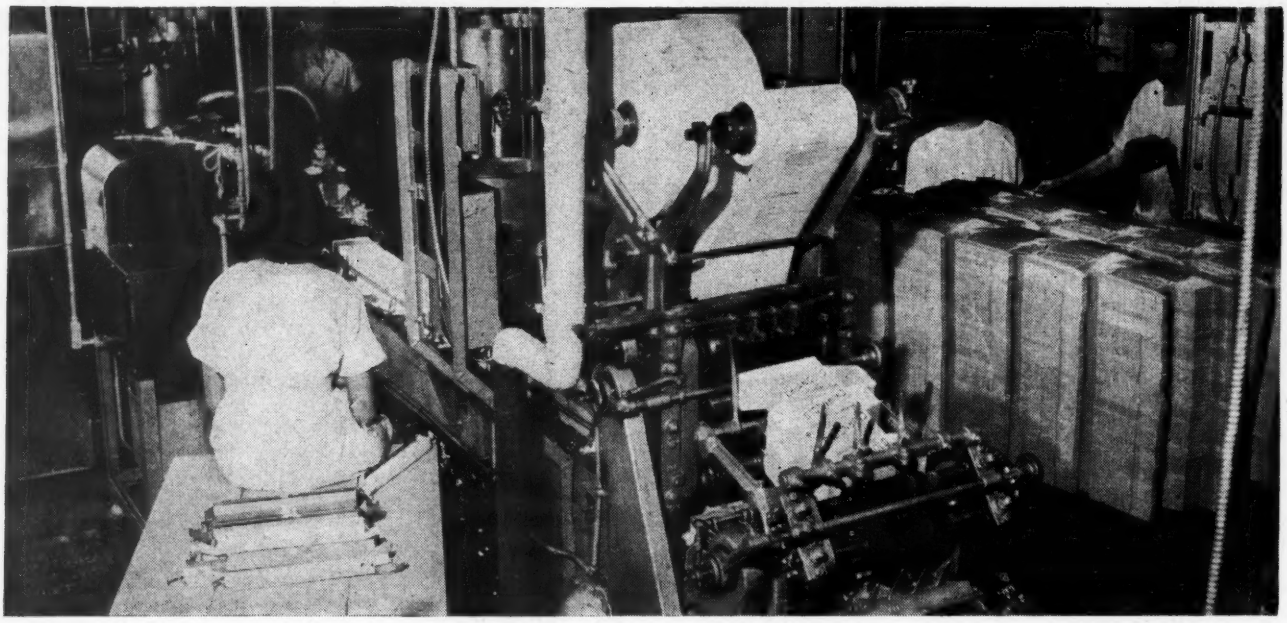
In the process, a lactic acid culture is added to the pasteurized skim milk at 70 deg. F. After a ripening period of from 10 to 14 hours the cultured milk is cooled. Salt, benzoate of soda, diacetyl and



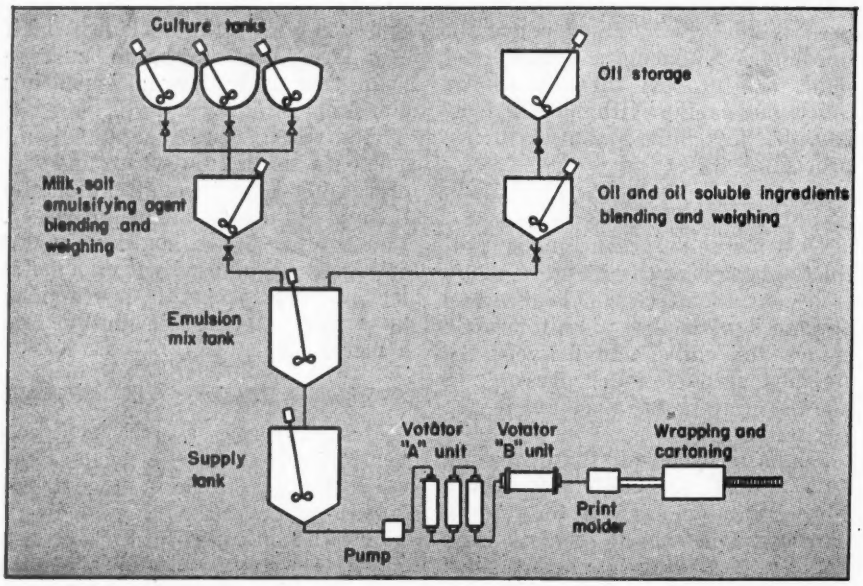
6. A PAIR OF VOTATOR units which process 75,000 to 77,000 lb. of Churngold margarine in a 10-hr. day.



7. THE FINISHED PRODUCT discharges into a printing machine which molds it into 1-lb. prints.



8. **THE PRINTS of margarine, being discharged from the molding machine, are automatically wrapped and packaged in individual waxed cartons. The packages are then assembled into larger cartons which are sealed for shipment to retail stores.**



9. **FLOW DIAGRAM of continuous process for the manufacture of margarine in the Churngold plant.**

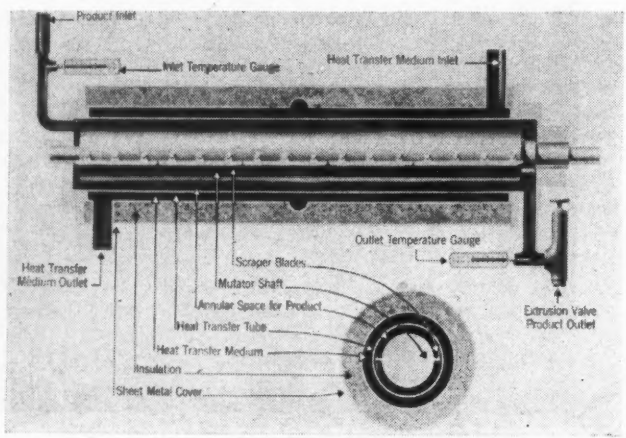
an emulsifier are added, with vigorous agitation. The vegetable oils, lecithin and vitamin A, are mixed and added to the skim milk. After proper agitation the emulsion of skim milk and oil is pumped to the Votator where it is instantly chilled as small quantities pass over a relatively large heat-transfer surface.

Advantages of the closed, continuous Votator margarine process are:

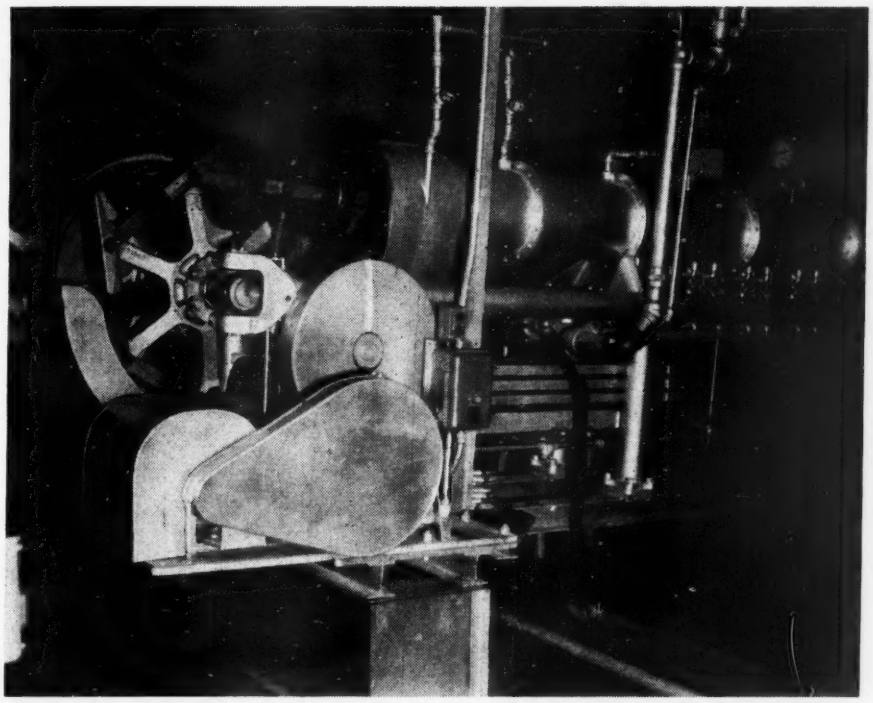
1. The closed system prevents external contamination.
2. A uniform product is assured.
3. Economy of operation.
4. Low capital investment.
5. Due to reduced fat losses a high yield is obtained.

The accompanying illustrations and flow diagram, made in the Churngold's plant in Cincinnati, Ohio, show how Churngold margarine is produced.

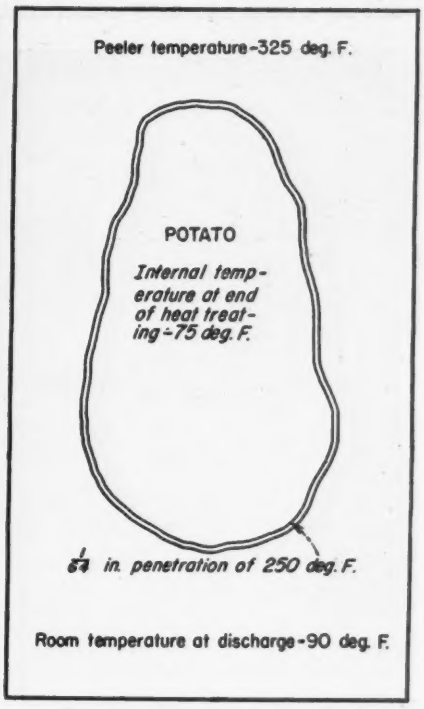
Votator Used in Continuous Production of Marshmallow for Bakeries



A continuous process for the preparation of marshmallow for depositing on cookies has been developed by the Votator staff. The sirup, gelatin solution and air are metered into one end of the Votator cylinder and extruded from the other end as thoroughly whipped, precisely aerated and correctly cooled marshmallow. Microscopic examinations reveal that the air cells are uniform in size and distribution. No large air bubbles or signs of deterioration were apparent after several days' gelling. The marshmallow has a rich, velvety sheen and may be readily coated with chocolate. Water is used as the cooling medium in the annular space surrounding the heat transfer cylinder. Labor savings of up to 66-2/3 percent are estimated as resulting from this process, together with a saving of 50 percent in floor space. The processing system being completely enclosed, the product is fully protected from contamination. Clean-up is simple—hot water being introduced into the Votator behind the ingredients at the end of the run. Capacity of the single cylinder, 4-in. Votator unit is 500 lb. per hr. Two and three cylinder units are available for larger production.



PROCESSING is done under steam pressure in moving retorts, formed by gasketed pistons mounted on an endless chain moving through a stainless steel tube.


Peeler temperature-325 deg. F.
POTATO
Internal temperature at end of heat treating-175 deg. F.
1/64 in. penetration of 250 deg. F.
Room temperature at discharge-90 deg. F.

POTATO skins are loosened by the heated vapor from the underlying tissues.

It Peels—Blanches—Cooks

Fruits and vegetables are processed in small batches, under controlled temperatures for predetermined periods, in this new unit. Operation is continuous, materials are uniformly heat-treated and losses minimized

By E. S. STATELER, Associate Editor, "Food Industries," Chicago

AFTER four years of experimental testing and design improvement, a new and fully engineered unit of fruit and vegetable processing equipment is now ready for commercial use. It may be used as a blancher, as a continuous cooker or as a continuous peeler, operating under a controlled steam pressure ranging from 1 up to 100 lb. per sq. in.

In its essentials, the unit is a pressure steel tube fitted with steam inlet orifices, indicating pressure gages and vents to a condensate return line, through which a series of gasketed pistons are drawn in the manner of an endless chain. The spaces between the gasketed pistons have a capacity of 0.8 cu. ft. and function as processing chambers while inside the tube and under steam pressure.

This unit has been operated under pilot plant conditions by Processes, Inc., Milwaukee, Wis., for 3 years as a blancher; for 7 months as a peeler and for short periods as a cooker. As a blancher, it has operated on beets, carrots, white potatoes and sweet potatoes or yams. It has been used to peel potatoes, beets, carrots, onions, apples and grapefruit; shell coconuts, and cook salmon.

As built by Cleaver-Brooks Co., Milwaukee, Wis., it conforms to disclosures made in U. S. Patent No. 2,403,871, granted July 9, 1946 to Douglas McBean, Rochester, N. Y. with modifications by Duane E. Kress of Processes, Inc., to meet operating conditions.

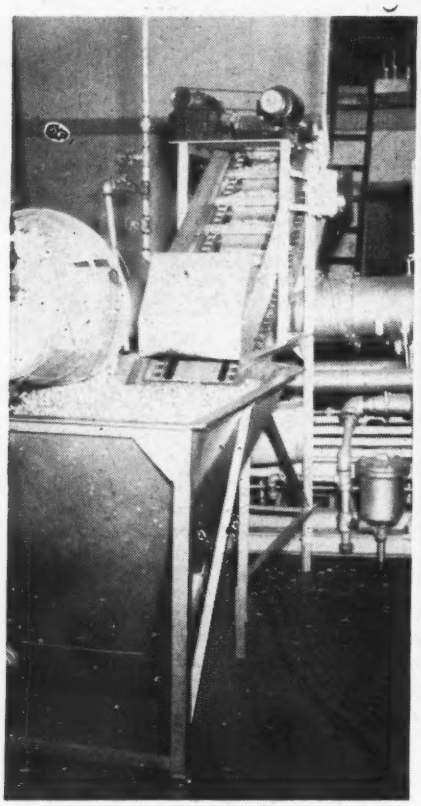
Construction

The pressure tube consists of nine sections of 12-in. diameter, 3/16-in. thick stainless steel pipe connected by bolted flange joints to form a treatment chamber 24 ft. long. Five of the sections are fitted with steam inlets, each under automatic pressure regulating controls to permit injection of steam at a predetermined pressure into each section of the tube. Stainless steel jointed rod linkages connect the series of gasketed, stainless steel pistons and permits them to be drawn through the tube by motor-driven sprockets mounted at each end of the machine. The pistons move through the tube under variable speed drive control, powered by a 2 hp., 220 volt, 3 phase, 60 cycle drip-proof motor.

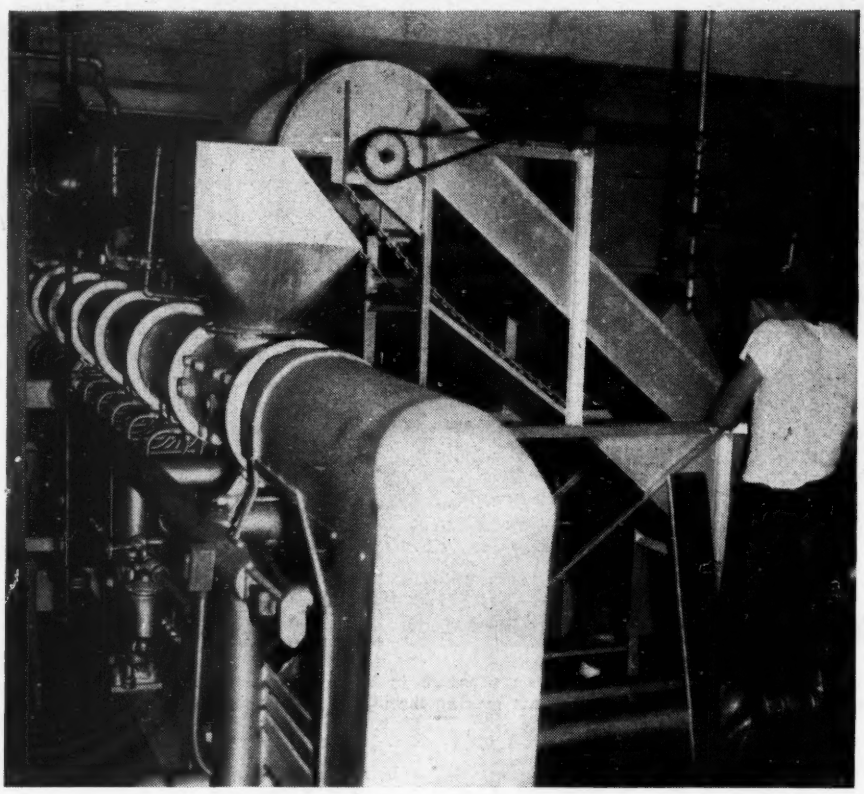
Steam-and water-resistant Garlock gaskets fit the pistons to the inside diameter of the tube to assure maintenance of steam pressure in the space between the pistons. These spaces function as moving retorts, and their contents are subjected to a predetermined temperature for a predetermined time.

As the gaskets wear, they may be expanded to compensate for the loss in overall piston diameter. On a

Unit Is Used for the Continuous Blanching of Green Snap Beans



FEEDING is continuous by a chain-and-slat elevator from a hopper type washer.



BLANCHING is in individual batches for a predetermined length of time at a controlled temperature with minimum exposure to atmospheric conditions.

10-hr. per day operation, only one adjustment is needed in 12 months. Since the movement of the pistons through the tube is under variable speed control, their rate of movement is adjustable to obtain the desired time of treatment corresponding to the treatment temperature.

Capacity

The production capacity of the unit varies with the type of food materials under treatment and with the operation; whether blanching, cooking or peeling. When used as a blancher, its capacity varies from 5 to 7 tons per hr., depending upon the fruit or vegetable being blanched, upon their variety and degree of maturity and upon the degree of blanching required. If they are to be canned, the blanching is for surface effect only and may be for as little as 15 sec. If they are to be frozen or dehydrated, the blanching time will be for as long as 2 min. in order to inactivate enzymes throughout the material without a cooking effect.

Time of treatment required for peeling varies from 15 sec. to 1 min. with a corresponding inverse variation in production capacity, based on the 7-tons-per-hr. production rate for 15-sec. treatment time. When used as a cooker in packing salmon, the unit has a capacity of 2 tons per hr., operating under 45-lb. steam pressure for 6-min. cooking time, to give complete softening of the salmon bones and complete recovery of the fish juices.

Continuous Operation

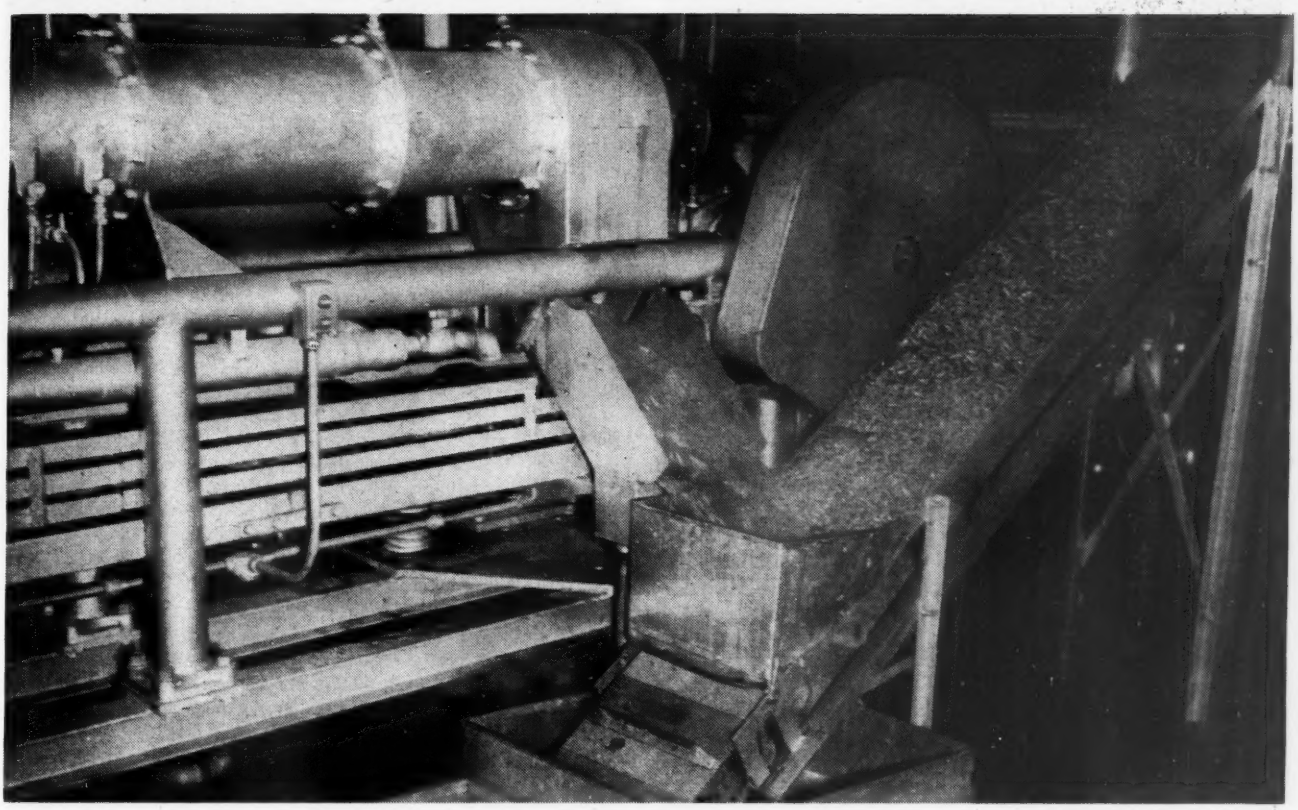
One of the chief advantages of the unit is that it permits continuous operation although the materials processed are handled in small batches. The material to be treated is fed from standard preparation units, whether they be dicers, cutters, stemmers, sorters or conveyors, directly into the spaces between the pistons. Exposure to quality deteriorating conditions is negligible. During passage through the tube, each portion of the material is turned or tumbled, and subjected to the same steam pressure and temperature for the same period of time without formation of aggregates or packing. These results are obtainable, partly by the mechanical action of the pistons as they are drawn through the tube, and partly as a result of the volume of the individual batches charged into the spaces between the pistons.

Volume of the batches varies for the different food materials being treated, and is predetermined to permit freedom of movement of the materials under treatment as well as to allow for swelling or expansion during heat-treating. Freedom of movement is essential to obtain the rolling or tumbling effect essential to the avoidance of packing, forming of aggregates and "spotty" heat-treatment. Forward movement of the individual pistons, plus the "drag" of the material on the bottom inner surface of the tube, causes the material to be kept in a tumbling motion during the heat-treating period.

In some instances the capacity of these "moving retorts" may be increased or decreased to give the best processing results. Discharge may be direct into standard quality graders, can or jar fillers, rotary spray washers, or conveyors for further processing or handling such as: Freezing, dehydrating, or skin and shell removal as in the case of grapefruit and coconuts.

Continuous operation permits: (1) Positive and improved control over the time and temperature of treatment; (2) saving in labor; (3) reduction in loss of nutritive values resulting from exposure to light, atmospheric oxygen and air-borne contaminants; (4) curtailments of enzymic changes during lapse of time between preparation and heat-treatment; and (5) economy in use

Blanching Capacity Seven Tons Per Hour



DISCHARGING into hopper, beans are separated from condensate accumulated during blanching. Slatted rubber belt conveyor transfers them to the next station on the production line. Blanching time can be varied from 15 seconds to two minutes.

of steam, hot water and equipment.

When used as a peeler, the unit has a capacity of 7½ to 10 tons per hr. It shows losses of only 9 to 11 percent for potatoes, even with the removal of eyes and scab defects; 8 percent for carrots; 11 percent for beets and 10 percent for sweet potatoes, when operating under 65 lb. per sq. in. steam pressure. Peeling by this method eliminates hand trimming and eye or scab removal.

In the case of grapefruit, the heat treatment has to be followed by the manual operation of slipping the peel or skin off the fruit as a mitten is slipped off the hand. Coconuts merely require the cracking and removal of the shell similarly to the removal of the shell from boiled eggs.

Separation and removal of the skins of root vegetables, onions and apples, are accomplished during passage through a rotary water spray washer. The eyes, scab defects, sun scalds, rootlets and other surface defects peel off, as do the skins, under the impact of the water spray and rubbing against each other and the walls of the perforated drum during passage through the washer.

Easy removal is made possible by the mechanical action of the heated moisture vapor produced between the skin, eye, scab, scald and other surface tissue and the edible tissue as the vegetable or fruit progresses through the tube from the zone of highest steam pressure and temperature to the zones of reduced pressure, and finally to the discharge end of the tube. As these external pressures are reduced, the vapor pressure of the moisture in the underlying edible tissues becomes sufficient to break the adherence of the external layer to the underlying layers.

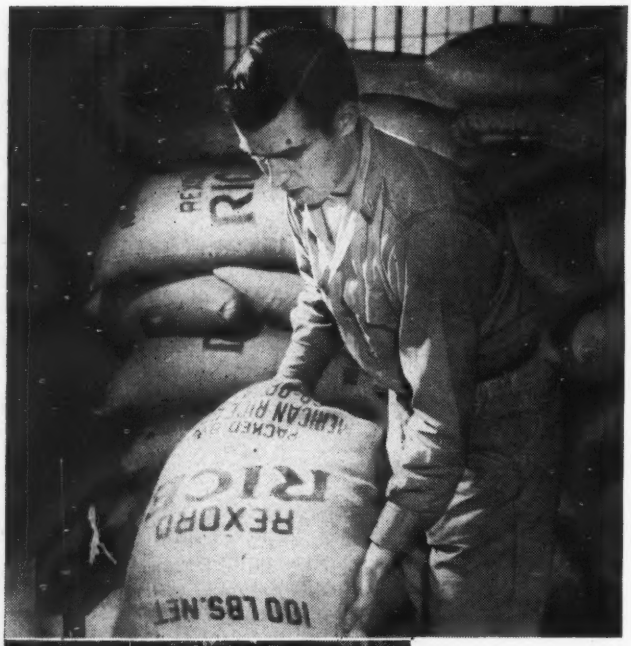
When the discharge zone is reached, and the external pressure is reduced to slightly less than atmospheric (by the effect of the escaping steam), the force of internal vapor pressure becomes explosive and disrupts the skin, peel and other surface tissues sufficiently to make their removal easy. The peel of grapefruit becomes so spongy and slippery that it is readily and easily slipped off the fruit without breaking the fruit cells and losing the juices.

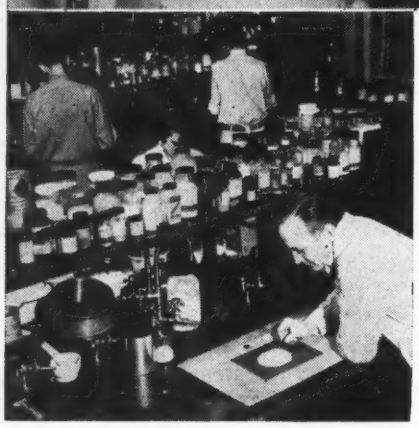
Time and temperature of treatment in the tube is sufficient to obtain the desired depth of penetration into the underlying edible tissue without any cooking effect on products. The sudden reduction of pressure to slightly less than atmospheric at discharge results in sufficient evaporation of surface and near-surface moisture to give an almost instantaneous cooling and stoppage of the incipient cooking effect. This sudden cooling results when the unit is used as a blancher or cooker, as well as when used as a peeler, and prevents a continuation of the heat-treating beyond the predetermined period of time controlled by the rate of travel through the tube.

Exhaust steam flushes out the "moving retorts" to remove any clinging particles of the fruits and vegetables being heat-treated. Since no lubricants are used, or needed on the link joints between the pistons, there is no possibility of lubricant contamination of the food materials.

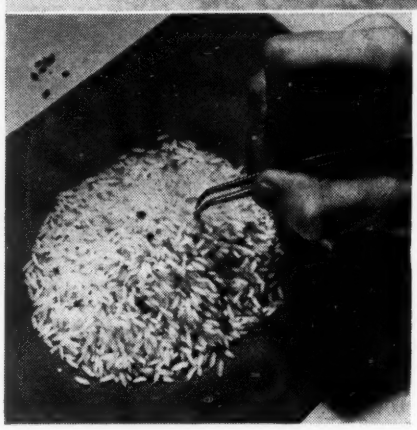
Steam loss during a 10-hr. operating day, measured in terms of boiler water used, is approximately 800 gal. A 40-hp. boiler will provide an ample volume of steam.

The compact design and construction of the unit permits installation in crowded areas as well as the installation of multiple units in a limited production space. A single unit requires a floor space 25 ft. in length and 30 in. in width with a ceiling height of 5 ft. installed complete with motor and variable speed drives control.





1. PLANT is at Orange, Mass., in 51-year-old factory of "Minute" Division of General Foods. Bags of raw rice (above) are emptied into hopper. LABORATORY at Hoboken, N. J., developed process. Variety of rice (left) has been found an important factor.



2. INSPECTION belt carries rice under lights where girls pick out weed seeds, hulls and discolored kernels, by means of suction tubes. CLEANING rice for pilot plant operation (left) was a tedious procedure done with the aid of a pair of forceps.

Instant Rice—From an Idea

How General Foods Developed Pre-cooked Rice for Its Line of Convenience Items—

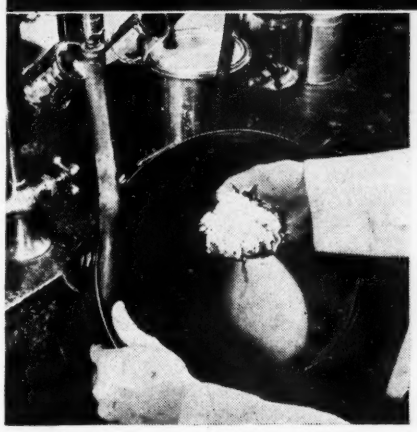
BEFORE putting "Minute Rice," its newest convenience item, into full production, General Foods Corp. spent over five years in development work and built three separate pilot plants. Problems of all kinds were encountered, many of them unforeseen. With the rice project successfully concluded, however, General Foods believes that it has ended the trouble and uncertainty hitherto attending the preparation of rice in the kitchen.

The company originally became interested in a quick cooking rice when its officials witnessed a demonstration in which fluffy rice was prepared in a few minutes, in comparison with the usual tedious and painstaking cookery required to produce superior rice for the table. Before an acceptable product could be turned out on factory scale, however, it was found necessary to work out every phase of the method of preparation, first in the laboratory and then on pilot plant scale.

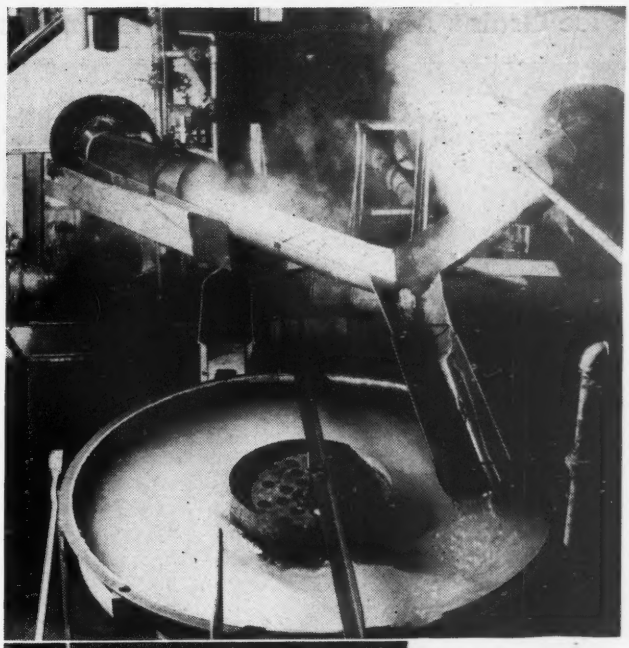
Of the various steps in the process, the drying operation was found especially troublesome. Before it was solved, new drying technics and equipment had to be devised. Also, complete pre-cooking of the rice was abandoned in favor of controlled partial cooking. This involved the development of new laboratory methods for establishing the degree of doneness of the rice in the plant. When a successful product was finally obtained, it was found necessary to work out special packaging in order to keep the material in good condition.

Much of the work on the quick cooking product was done during the war, which proved both a help and a hindrance. Even before the process was finally worked out, the pilot plant was virtually appropriated by the Quartermaster Department which demanded all of the available output. Yields at this time were satisfactory for special rations, but were not high enough to satisfy the competitive situation in a commercial consumer market.

Subsequent refinements in the process did make the product a good commercial proposition. Output of one of the pilot plants was enthusiastically received in a test market. A commercial scale production plant has accordingly been put into operation. Since these facilities supply only a fraction of the potential market, however, a new production



3. CONVEYORS of spiral type run raw, inspected rice from storage bins into the soakers. Rate of feed is controlled by varying speed of the conveyors. TRANSFER of raw material for pilot plant tests (left) needed no special equipment. Laboratory lots ran up to 50 lb.



4. COOKERS discharge rice, flooded with water, down Y-shaped flume into a Lewis washer. Washed rice is discharged from bottom of washer, then is forced into flume, thence to drain belt. KETTLE in laboratory was easily controlled, but held substantial amounts for tests.

To the Perfected Product

—Special Methods of Drying and Quality Control Are at the Heart of the Process

plant has been specially designed. Immediate acceptance of the product by the public is regarded as a full endorsement of General Food's policy of stressing service and convenience items.

The cooked rice proposal originally came into the offices of the sponsors "over the transom." Any corporation the size of General Foods has a continual flow of correspondence presenting new ideas and inventions for sale. The product now known as "Minute Rice" is, however, the only major one ever brought to the attention of General Foods in this manner.

The rice idea was brought in early in 1941 by a gentleman who introduced himself as Ataullah K. Ozai Durrani, cousin of the King of Afghanistan. The promotor had worked out in a small kitchen a product he called "pre-cooked" rice. With a little demonstration kit, he prepared in a comparatively few minutes a sample of a fluffy southern rice which ordinarily takes hours of detailed work in the kitchen. Each grain was light, fluffy and individual, similar to steamed rice popular in the south.

Convenience Item

This demonstration immediately interested the management of General Foods Corp., whose principal business is the manufacture and sale of food products which feature convenience of preparation by the average housewife. An instant rice fitted this picture, despite the fact that the company knew nothing of rice at the time and was not in any way associated with the rice business.

As often happens, the original demonstration was convincing, but Mr. Durrani, the inventor, was rather vague as to what had been done or what conditions would produce the material consistently. When he was given laboratory facilities to prepare additional samples, it became evident that the production of instant rice by his method was essentially a trial-and-error proposition.

At this point, General Foods assembled laboratory teams representing the necessary diversification of talent for a thorough study of all aspects of the problem. The objective was to prepare an instant rice for the "Minute" brand name, suitable for preparation at home by

Rice Grains Are Case-hardened in Unusual Drying Operation

5. DRYING operation uses new principles, special equipment, unusual control methods. Rice moving from drier drops off belt into spiral conveyor. Bucket elevator takes it back to top floor. Kernels are separated and screened.
TRAYS are being loaded (left) for laboratory drier.

6. SEPARATOR is used to take any seeds and broken kernels out of dried rice. Plant separator (above) is efficient.
SIFTING and hand picking were used to remove broken grains from tray (left) taken from pilot plant drier. Rice at this stage is cooked, dehydrated product.

the addition of water, followed by comparatively short cooking.

Following the inventor's scheme, there was originally envisioned a product consuming approximately 20 min. preparation time, part for rehydration and part to finish cooking of the rice. Early experiments by both Durrani and General Foods had demonstrated the inadvisability of doing a complete cooking job, principally because of drop in yield.

Steps in the preparation were seen as: Soaking, cooking, washing, drying of the cooked material. These did not seem to add up to a formidable research program.

Soaking Step Studied

In the case of the soaking operation, early experiments indicated that appreciable losses could be taken in yield at this stage either through sloughing or through loss of the product by souring. Curves showing rates of imbibition were accordingly developed. From these curves the optimum soaking conditions were arrived at.

Further experiments showed that variety of rice was an important factor. Individual imbibition curves were consequently developed for each variety.

Cooking conditions were found to be entirely dependent upon the moisture content of the rice going to the cooker, which made it essential that a precise moisture control be maintained at this point. The imbibition curves were helpful in this respect.

A study of cooking conditions indicated that the desired end product was obtained when the rice was about 60 percent cooked. The time necessary to accomplish this was found, however, to depend on many factors. Some form of control was needed. A procedure was developed for mashing cooked grains between two glass plates, then counting the white, uncooked centers which remained in the product. This analytical method was found to correlate well with the cooking times. It was used thereafter as a quantitative appraisal of the degree of cook.

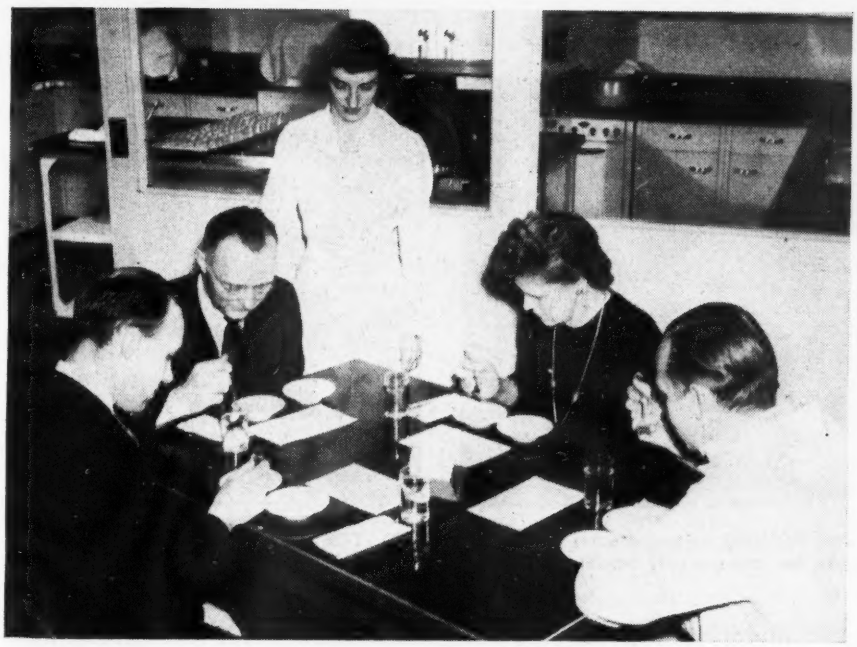
The development work up to this point had been of the plugging type —long and tedious but not difficult. When the investigators started to take up the drying effects, however, they soon found themselves in the same situation as Durrani—they could not reproduce their results on any ordinary drying equipment.

Drying technologists had grown up with the theory that material should not be case-hardened, for an efficient drying operation. In the case of the rice product, density measurements and microscopic examination of satisfactory samples indicated that these had been dried with little or no shrinkage of the grain. Apparently the insides of the starch grain had pulled away from themselves and towards the wall of the grain as drying progressed.

New Theory

Faced with this revolutionary fact in drying, the investigators developed the following hypothesis: The drying conditions had to be such that the outside of the grain

Packaging, Process Control, Taste Testing, Are Important



7. PACKAGING committee shown above, left, presents its findings to Dr. Aksel Olsen, manager of General Foods' Central Laboratory. Package material chosen avoids development of rancidity in rice.

8. CONTROL of cooking and drying operations involved the development (above) of unique laboratory methods. Best results are given by 60 percent pre-cooking. "Hole count" of grains proved useful index.

9. TASTE panel at General Foods' laboratory (left) passes on final product. Individual grains, fluffy and entire, are characteristic of product following "instant" cooking. Hollis Burgess, sitting at the right, was "Minute Rice" project leader.

was case-hardened very rapidly, so as to limit shrinkage to a minimum and fix the final grain dimensions. From this point on, conditions had to be such that this outer skin was not permitted to shrink during the rest of the drying. This in essence meant that the inside of the rice grain, as it shrunk, was compelled to pull toward the fixed outside wall. Such conditions had been unknown in the past, and in addition, everything possible had been done to prevent this situation.

Once the necessary drying conditions had been defined, the laboratory developed special drying equipment to operate at extremely high temperatures and air velocities in an effort to establish the needed conditions and to produce uniformly consistent results, without running into difficult design problems.

"Hole Count" Index

One qualitative evaluation of the effectiveness of the drying procedure was the bulk density of the product. Another index was the rate of imbibition of moisture. During the early stages of the work, however, it was found that the best indicator of good drying conditions and a satisfactory product was a so-called "hole count" based on 100 grains of rice.

For the "hole count," 100 sample grains were picked from each lot. The number of pockets or holes in each grain was counted. This count appeared nearer an absolute standard for establishing drying conditions than either bulk density or rate of imbibition. It was used for most of the laboratory experimental work. In addition, color became an important criterion.

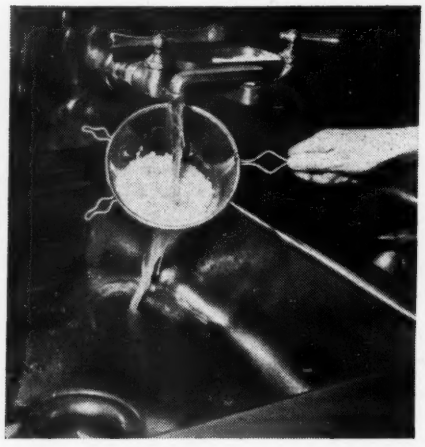
Early experiments with the drying equipment indicated that air velocities in the neighborhood of 600 feet per min. and temperatures of 300 to 400 deg. F. were necessary to produce minute rice. Humidities had to be limited to 0.20 lb. of water per lb. of dry air. Drying times were established as less than ten minutes.

Work Extended

With the general conditions for proper processing established in the laboratory, the work was extended in two directions. The chemists took up various ramifications of the problem, including studies of rice varieties, nutritional questions, application of the process to pretreated rice and to brown rice. The process development work was shifted to a larger

General Foods Corp. Shows Where Cooking of Ordinary Rice Can Easily Go Wrong

1. EXAMINATION of the raw material is the first of six or seven steps.



2. WASHING before cooking brings the elapsed time up to ten minutes.

3. COOKING begins — assuming the water was put on to boil beforehand.

Pre-cooked Rice Is Standardized, Quick and Sure-fire

1. WATER—one cup is added. Rice was washed and cooked by the processor.

2. BOILING for two minutes and seasoning are the only two steps.

3. TEN minutes in all and the rice is ready—and perfectly done.

scale, the engineers building in Hoboken a pilot plant capable of producing about 50 lb. an hour. This was the status of the project in March, 1942.

It was at this stage that the Army approached General Foods with the object of securing supplies of instant rice for use in field rations. Because of the conditions under which it was to be used, they indicated a preference for a completely cooked product which could be prepared in the field simply by the addition of warm or hot water.

Although prior experience had indicated the difficulties of the Army's request, General Foods was able to modify its product so as to meet the requirements, although at a yield of only 65 percent. From this point on, instant rice was delivered from the pilot plant operations in volumes up to 25,000 lb. weekly, and used by the Quartermaster department in a number of ways. It was packed into several rations as instant-cooking rice. It went into the "Ten-in-One" and the "Five-in-One" ration as a meat and rice combination. It was used in a special rice pudding mixture for rations and commissary use.

Second Pilot Plant

The necessity for meeting production schedules on the Army material handicapped development of the consumer product. Much valuable information was accumulated during this period, however, with the result that, between June and December, 1943, a second pilot plant was designed and built at Battle Creek, Mich. It was intended to be principally for research study, since the first pilot plant had been converted entirely to production. Before the second plant was even completed, however, the Army indicated a need for its output as well, with the result that the second pilot plant, also, was turned over for production.

With the loss of the second semi-works, the development department went ahead immediately with plans for a third pilot unit in which to further improve the process. Originally, the laboratory had laid down rigorous specifications for drying the product. During the two and a half years of experience, however, it had been found that the requirements could be modified if the proper flow of air and proper loading of the drier were taken into consideration. The extreme conditions originally specified for air velocity, temperature and humidity were far beyond anything normal for drying in the food industry, and were almost prohibitive in terms of large volume costs.

A first objective for pilot plant

When Mrs. Consumer Starts From Scratch

4. DRAINING after cooking is usually followed by another washing.

5. TESTING the cooking—and deciding to leave it on longer.

6. FORTY minutes in all—should be done, but how light and fluffy?

No. 3, accordingly, was to bring the drying conditions down to a practical procedure. Also, since previous pilot plants had been operated on a batch basis, another objective for plant No. 3 was conversion of the process to continuous operation.

The No. 3 Plant

The No. 3 pilot plant was built at Orange, Mass., in the General Foods "Minute" Division factory, where some equipment was available suitable for semi-commercial operations and where a regular production line could be set up as soon as conditions warranted.

The war ended before the No. 3 plant was requisitioned also for Army use, and it was consequently available for essential engineering studies. After the plant had been operated continuously for six months, the following had been accomplished:

1. Process had been placed on a continuous basis.
2. Standard canning equipment had been modified so as to handle rice as far as the drying operation.
3. Air velocity and temperature requirements for drying had been reduced to the point where Proctor and Schwartz could meet the drying requirements by making modifications in the fans and heaters on their standard driers.
4. Technics for handling rice gently through the entire operation had resulted in raising the recovery from 65 to 85 percent.
5. Studies of rice varieties, done in the laboratory, had been checked through the pilot plant. Material produced in the pilot plant had been used for extensive recipe development, consumer evaluation, and market research.
6. Comprehensive package tests conducted on the pilot plant product permitted the writing of package specifications to provide adequate protection for the product.
7. Rancidity problems which cropped up from time to time were solved when shown to be correlated with drying conditions and the type of package used.
8. Infestation studies on pilot plant product and raw material permitted the writing of the necessary sanitary and package specifications to provide protection in this area.

First Production Line

At this stage, the installation of a one-line production unit was authorized. This unit went into operation in September, 1945. It was designed according to pilot plant specifications and had a capacity of 1500 lb. of Minute Rice an hour. This commercial unit has been producing continuously. There has not been a single serious difficulty with regard to process, product, output or cost estimates. A second production line has been ordered for the Orange, Mass., plant, and in addition, an entire new plant, designed especially for Minute Rice, is now on the drawing boards.

Market Research

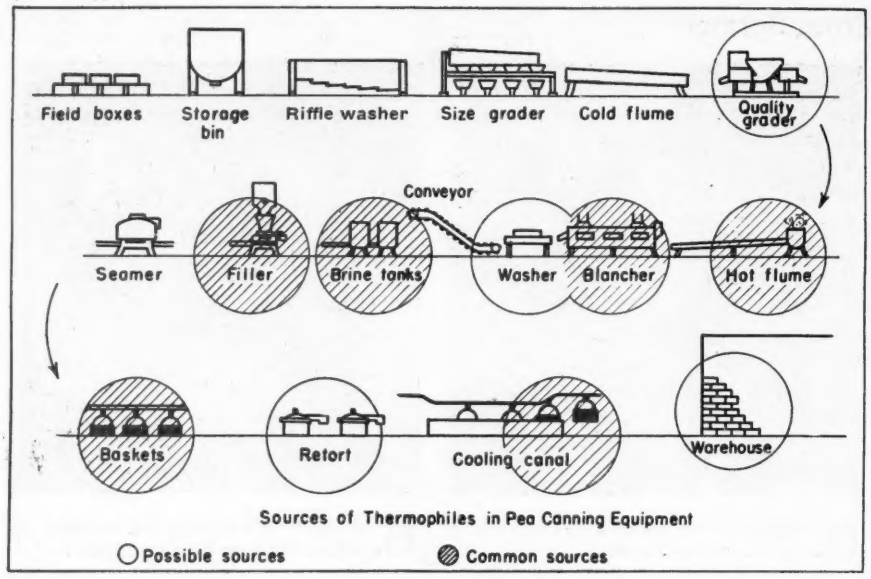
Interesting sidelights on consumer preference came to light as the pilot plant production was going out for test marketing and preliminary sales. The product was introduced to the U. S. public in the General Foods Atlanta and Philadelphia sales districts in March, 1946. Acceptance since that time has been limited only by the quantity of rice available. Sales were extended to the Chicago and Detroit districts in January and February, 1947.

One of the interesting angles which came to light through sales experience was a 2-1 public preference for long-grain rice. Early in the laboratory work, later on in the pilot plant work, the research department found enough difference between long and medium grain rice to recommend long grain for production. Market research on a small scale did not bear this out, however, so that it was decided to concentrate on medium grain while extending the market research. Present findings now appear to bear out the laboratory's early recommendations.

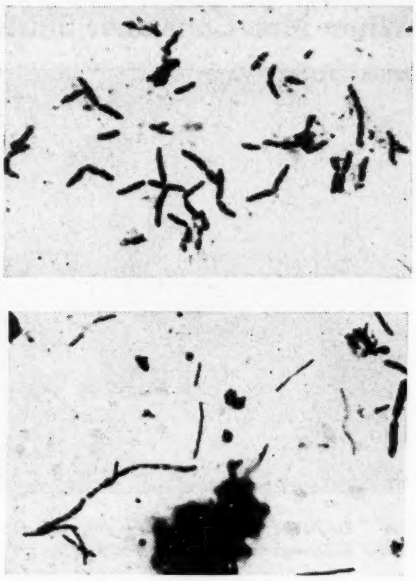
Other "Instant" Products

Additional products using instant rice—including prepared rice dishes and rice puddings—have been developed, test marketed and held ready for release as soon as immediate shortages are over. Vitamin fortification of the product to brown rice levels has been studied and the necessary equipment designed for performing this operation. General Foods believes that Minute Rice is the only rice product which, when fortified, can deliver to the housewife's table its complete, initial vitamin content. This is due to the fact that no excess water is used in its preparation. Patent applications covering various angles of the process and product are now on file. The company expects that its new product will be the means of stimulating rice consumption on a nationwide basis, thereby providing an outlet for the war-inflated domestic rice crop.

Minute Tapioca, earlier product in the General Foods Minute Division's line, will probably be back in production in due course, depending on the supply of raw materials. In the meantime, the test marketing of Minute Potatoes is being continued.



SOURCES of thermophilic contamination and multiplication are indicated in this schematic diagram of a pea canning line. Vigilance at these "hot spots" reduces dangers.



THERMOPHILES from canned corn. (Above) Flat sours. (Below) Anerobes. Mag. 950 X.

Thermophiles in a Cannery—

Thermophiles enter a plant in raw products and ingredients and multiply rapidly

By B. B. LIPSKE and M. R. HUBBARD, Research Division
National Can Corporation, Maspeth, New York

UNTIL recently, vegetable canners have been fatalists as far as thermophiles were concerned—either they had them or they didn't. And any canner who has lost his entire season's pack from flat sours, swells or sulphur stinkers has justifiably developed a wholesome respect for these bacteria.

One thing is certain, however: The presence of thermophiles in a plant is no guarantee of an impending and unavoidable disaster. If this were the case, products such as peas, corn and lima beans would never reach the consumer in cans, for thermophiles are present in all plants processing non-acid vegetables. Their presence does demand respect and continued effort to keep them under control, but there is no need to be awe-struck at their potentialities, for their control is neither complicated nor expensive.

What They Are

Thermophiles are microscopic unicellular organisms, which depend for their existence upon animal or plant tissue, and which will grow at relatively high temperatures. Under the microscope, they appear as rods with occasional protrusions or dark areas. These areas are known as spores and are the principal cause for the canners' headaches.

The canner is not alone in his interest of these organisms since they are members of a large group of bacteria. However, the thermophiles known to cause spoilage in non-acid vegetables are of but three types: Flat sours, thermophilic anerobes and sulphur stinkers.

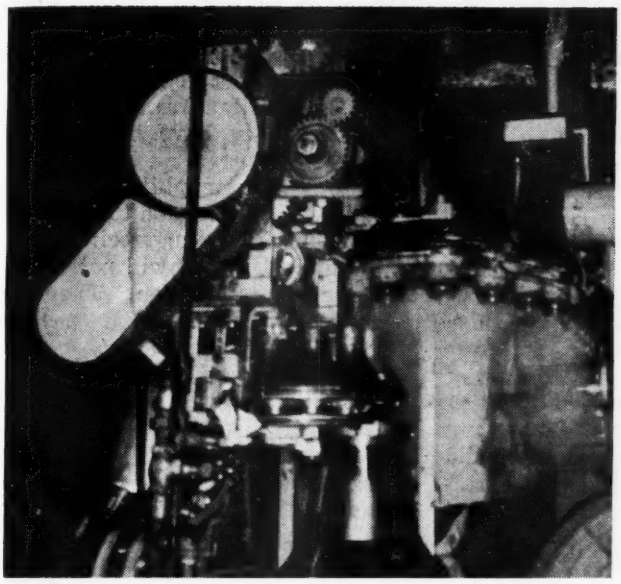
What They Do

The mechanism by which these bacteria cause spoilage is alarmingly simple. In the laboratory, under controlled conditions of growth, the flat sours consume plant tissue and liberate acid as a metabolic end-product. They prefer a temperature in the vicinity of 131 deg. F., but may also grow at 98 deg. F. There is a bare possibility that a small amount of gas may be produced as an end product, but authorities are not yet in agreement on this point. In the can, they produce a sour taste and odor in the product and a slimy liquor. The can may be a flipper but usually there is no external indication of spoilage. The product color is unaffected.

Thermophilic anerobes consume plant or animal tissue and liberate relatively large volumes of gas. They will grow only at temperatures in the vicinity of 131 deg. F. Spoilage is manifest by hard swells and frequently blown cans. The liquor becomes frothy, the product is generally lighter in color and a sour cheesy odor is usually present.

Sulphur stinkers attack the sulphur-bearing compounds of corn and occasionally other vegetables to produce hydrogen sulphide gas. This gas, the same as that generated in rotten eggs, causes a loss of vacuum in the can. The product has a characteristically vile odor and is blackened.

With the exception of flat sours, these thermophiles will grow only at temperatures of 110 to 160 deg. F., the optimum temperature being 131 deg. In addition, flat sours may also grow at temperatures as low as 70 deg. F. Spoilage from sulphur stinkers is rare, but when it does occur, the entire pack is frequently lost. The incidence of the other two types of spoilage is far more prevalent, particularly flat sour. Cans which contain a sour product and which appear normal on the outside are always caused by flat sours, but blown cans may be caused by several factors other than thermophilic anerobes. Given the proper temperature, a can in-



AVOID hot filling if possible. When required, do not allow product to remain hot during short shutdowns.

IMPROPER RETORTING, such as too short a cook or too low a cooking temperature, may cause spoilage from flat sours.

Sources and Control Means

in hot equipment. Their incidence can be reduced by proper control methods

fected with thermophilic anerobes will develop an internal pressure sufficient to rupture the side seam, but should the temperature drop before this condition has been reached, the can might be only slightly swelled.

To summarize the effect of the thermophiles:

(a) Normal can.....
—sour product.....Flat sour
(b) Flipper, soft swell.....
—sour product.....Flat sour
—rotten odor, blackened product .....Sulphur stinker
—frothy liquor, cheesy odor— ..... Thermophilic anerobe
(c) Swell or burst.....
—frothy liquor, cheesy odor— .....Thermophilic anerobe

Where They Are Found

Any difficulties arising from bacteriological causes may be located in one or more of the following contamination sources: The raw product; added ingredients; or plant equipment. Thermophiles have not been found in the water supply, in the air or in containers from the can manufacturing company. They arise from the food materials, and build up in plant equipment to a concentration sufficient to cause spoilage.

The number of bacteria coming into a food processing plant is immense, but the number of thermophilic bacteria in the raw product is so slight as to be nearly negligible. A notable exception to this would be a raw product which has been allowed to stand for several hours at high temperatures. Following such treatment, the small number of bacteria normally present would multiply rapidly, becoming a potential source of danger. If a wooden field box is not washed thoroughly, and is allowed to stand at temperatures over 100 deg. F., thermophiles in the vegetable juices will multiply and subsequently be transferred to the next load of raw product. Such conditions are rarely found—of approximately 300 pea and corn canning plants surveyed in 1945, not one case of spoilage from thermophiles was traced to raw product contamination. Raw material as a source of contamination is a serious problem in an indirect way, however, in that those few thermophiles which manage to get by the preliminary washers may seed down plant equipment.

It is taken for granted that the raw product should not be stored in a hot room or in the sun, but one major point which is often overlooked is storing vegetables in deep piles for long periods, or without adequate air circulation. The heat developed from respiration, and from the fermentations occurring within the pile, will rapidly raise the temperature of raw products into the thermophilic growth range.

Ingredients

Of the ingredients added to non-acid vegetables during the canning process, the two outstanding thermophile-introducing components are sugar and starch. Certified canners' sugar is doubtless a wonderful technological improvement, and an undeniable aid to the canner; but even if sugar or starch be completely free of thermophiles upon arrival at the cannery, improper handling, or the lack of common sense precautions, can easily make this material the source of disastrous spoilage. Starch may be even worse than sugar in one respect. Contaminated sugar can readily be washed out of sirup or brine tanks, lines and fillers, but contaminated starch may be cooked into a tough adherent film on mixers or conveyors, making removal all but impossible. Salt has not been found an offender; in fact, salt in high concentrations actually inhibits growth of bacteria.

Thermophilic Buildup

A buildup of thermophiles can occur in only two possible ways: By normal growth in equipment which is at least occasionally at temperatures of 100 to 160 deg. F., and by mechanical trapping of bacteria which have grown in some piece of

equipment along the lines. If plant operations were so maintained that temperatures of 100 to 160 deg. F. were nowhere to be found, and if plant equipment were so designed and cared for that mechanical trapping of bacteria were impossible, the word "thermophile" would never have become associated with processed vegetables. Mold growth on tomato packing equipment which is not properly cleaned soon becomes visible; bacterial growth in non-acid vegetable packing equipment rarely becomes visible.

The growth rate of thermophiles is phenomenal. Based on the figure that a bacterial colony will double in size every 20 min. under optimum growth conditions (131 deg. F. and ample food supply), a blancher with a count of 200 thermophilic spores per c.c. of liquid, or 800,000,000 spores per 1,000 gal. would, under optimum conditions, have a total population of about 15,000,000,000,000,000 per 1,000 gal. at the end of 8 hours. Bear in mind that fewer than 10 spores per No. 2 can before retorting have been known to cause spoilage.

It would be impossible to attempt to list all the places in which thermophiles might grow, but a partial list of the equipment to which flat sour or thermophilic anerobe spoilage has been frequently traced can be presented.

Blanchers—These are the principal source of thermophilic contamination. In tubular blanchers, inadequate cleaning or allowing the temperature to fall in the 100 to 160 deg. F. range will cause excessive buildup. When a portion of the blancher is blocked off or bypassed to shorten the blanching cycle, the temperature frequently falls within the thermophilic growth range, and is particularly dangerous if vegetable juices from previous batches are allowed to remain stagnant. Reel blanchers contain an excellent growth media, and unless the inlet pipe is constantly adding sufficient fresh water, serious contamination can rapidly build up.

Fluming vegetables into the blancher with blancher overflow water is begging for trouble. Allowing blanchers to fall into the 100 to 160 deg. F. range during operation, during the noon or evening shutdowns, or even when supposedly clean will also cause trouble. Leaking steam valves have been known to raise "clean" blancher temperatures up into the thermophilic growth range during the night. Non-flush pipe and drain connections, and dead end drains will readily collect refuse and entrapped thermophilic spores. Scale on reels and shell will harbor spores from day to day and even over the winter and spring months when not in use.

Blenders—This equipment is subject to the same thermophilic growth conditions as are mixers (see below). The cooked starch problem may be greater since blenders are normally in longer operation between cleanup periods than are mixers.

Brine Lines—Since the only way to clean out brine lines is by flushing with fresh water, the scale and rust formations may readily build up high thermophilic concentrations. Briners at the filler will seed down with bacteria if not cleaned adequately, and if not kept above the thermophilic growth range. Filler drippings finding their way into the briners help make brine an excellent growth media.

Brine Tanks—Very few wooden brine tanks are still in use. Those which are used for salt solutions alone are relatively safe, but if used for sugar solutions they are extremely dangerous. Each pore, crack and joint harbors countless millions of thermophilic spores which may be scraped off at any time while mixing the brine. The spores will lie dormant throughout the entire off-season, ready to commence life again during the next pack. Metal tanks subject to rusting or scaling will have nearly the same effect as wooden tanks. Even in sound tanks of glass-lined or stainless steel construction, such practices as allowing the temperature to drop into the growth range during operation, or holding warm brine overnight, will so thoroughly contaminate it that every can receiving this brine during subsequent canning operations is subject to spoilage.

Conveyors—These are rarely the cause of contamination. The product may become re-infected if the equipment is inadequately cleaned, or is subjected to constant dripping from contaminated overhead equipment. In one case, a bucket type conveyor re-infected washed, blanched peas by carrying them through a sump pit fitted with a slow drain.

Fillers—The filler rates second only to the blancher as a potential focus of infection. Cold fillers, if kept clean, will not cause trouble by themselves, but hot fillers frequently contaminate the product. Hot filler temperatures are usually in the growth range, and during even short shutdown periods, bacterial populations build up rapidly on the product. Joints, pockets and cracks harbor hot vegetable juices, and will literally swarm with bacteria once they have been introduced.

Flumes—Thermophiles will not grow in cold flumes, and though not recommended, even recirculated water in cold flumes will not cause increased contamination. There is an important qualification in this respect: Once the vegetable has been through a hot process—any process whatsoever which raises the temperature of the vegetable surface over 100 deg. F.—the vegetable surface is subject to thermophilic contamination, and recirculated water should not be used.

Fluming is usually a good method of reducing bacterial population of all types if proper precautions are observed; but construction should be as simple as possible since dead ends, by-passes and flow diversion plates all introduce crevices for dirt collection. Hot fluming, even with fresh water, will build up thermophilic contamination. The use of blancher water for this purpose is exceedingly poor economy.

Foam—In general, foam contains appreciable numbers of all types of bacteria. Foam, above hot water storage tanks for pipe blanchers or flumes, has been frequently found in the temperature range of 100 to 160 deg. F. Foam on overhead tanks or flumes may drop onto otherwise sanitary processing operations below.

Huskers and Cutters—In normal operations, the husker and cutter temperatures are below thermophilic growth. If steam cleaned, however, there is a possibility of a slight buildup should the equipment be left warm.

Inspection Belts—Under normal operating and cleanup conditions, belts are not the cause of contamination. In one case history, however, thermophilic spores from a heavily contaminated blancher were carried over onto a rubber inspection belt, and, because of inadequate cleaning, the cracks and edges of the belt became thoroughly seeded with spores.

Mixers—As in all other equipment, maintained temperatures of 100 to 160 deg. F. can lead to excessive growth. Inadequate cleaning will lead to scale formation that will entrap thermophilic spores. Scale encrusted mixers have been found which will retain spores in a suspended condition throughout the winter and spring months, only to

become viable again the following packing season. Because of the intricate beater construction, and the formation of cooked starch films, mixers are exceedingly difficult to clean. Leaky steam valves can raise mixer temperatures to the growth range during shutdowns, permitting growth if sufficient water is present.

Pumps—Cold pumps will not cause trouble if they are kept clean. Hot pumps are a focus of infection because of the adherent film of starch and protein which is cooked onto the metal. Pump construction may make tearing-down and proper scrubbing difficult.

Quality Graders—If no changes in the water are made, bacteria gradually build up in quality pea graders. This is particularly true of those quality graders located after the blancher in the canning line. In this instance, the warm peas may slowly raise the temperature of the grader brine to the thermophilic growth range. The quality grader might be considered as another type of washer. The peas are subjected to a rinsing action in the grader, thus dislodging surface bacteria.

Size Graders—This equipment does not enter into the thermophilic picture since it is normally operated at relatively cold temperatures.

Tank Washers—Cold, clean tank washers will not lead to thermophilic spoilage. Many canners are still willing to take the risk of spoilage by using hot tank washers (such as corn flotation washers) to maintain high can vacuum. Because of the relatively complex construction of these washers, thermophiles will seed down in corners, screw conveyor, paddle joints and crevices, contaminating rather than washing the incoming kernels if the water is hot.

Washers—Reel and shaper type washers can contribute to the bacterial population in two ways: If dented or poorly constructed, particles of the vegetable may become entrapped along with bacteria, infecting the cleaned product as it passes through; or, if provided with inadequate sprays, the product contaminated from previous equipment may pass through the washer with heavy contamination still present. The same effect of insufficient sprays is duplicated by too heavy a product load. Hot washers are risky since the heated vegetables may be held up along the way, contributing to thermophilic growth. The use of recirculated water is particularly dangerous in washers since this is usually the last place in the line where bacteria may be removed.

Wash Water—Water from wells or mains is thermophile-free. The continued use of recirculated wash water will, however, build up bacterial populations of all types. The use of hot wash water is generally risky; when recirculated, it is practically a guarantee that spoilage will occur.

Wooden Equipment — From a general sanitary viewpoint, wooden equipment is dangerous, be it in the form of tanks, bins, or flights on a conveyor. From a thermophilic viewpoint, wooden equipment is dangerous if the product is warm or if the product has previously passed through any heated process.

Spoilage After Canning

Improper handling of a sealed can before retorting—and even after—may result in thermophilic spoilage. If a sealed can is held hot in the basket for an unusually long period prior to retorting (such as might happen through oversight or through chain hoist breakdown, steam failure or retort breakdown), the few thermophiles present will multiply sufficiently to produce a potential spoilage hazard.

Spoilage can be caused by improper retorting such as too short a cook or too low a cooking temperature. Flat sours may occasionally be the organism to cause spoilage under these conditions, although spoilage from understerilization is usually attributed to other classes of bacteria.

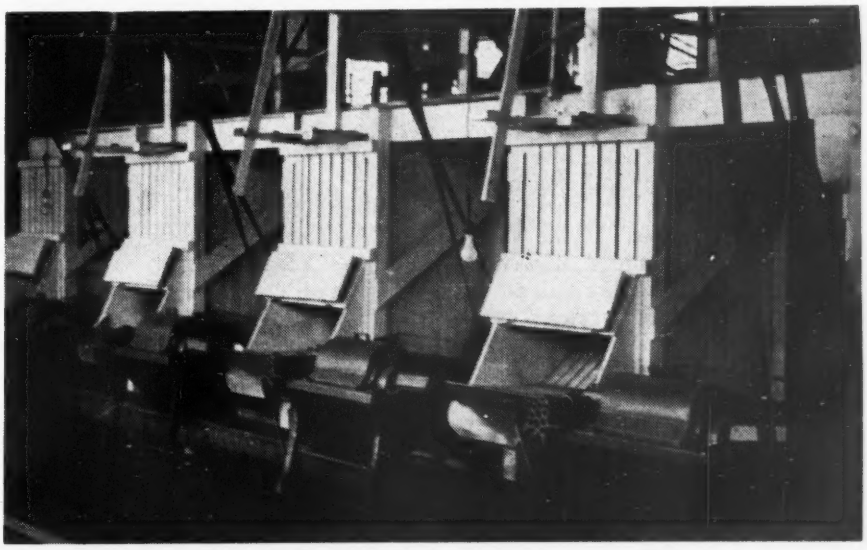
Undercooling retorted cans provides the ideal condition for thermophilic development. Retorting kills off all bacterial cells and most of the spores, but occasionally a few resistant spores will get through. Another and even more important reason for the survival of a few spores is excessive contamination of the filled can. The time and temperature of cook recommended is based on an organism with extreme (though not the highest) resistance to heat for an "average" contamination. Should the product contamination be excessive, the recommended cook will be insufficient. In any case, an undercooled can will retain temperatures in the growth range for long periods of time, frequently sufficiently long to allow the few spores present to germinate, reproduce and cause spoilage.

High warehouse temperatures will result in spoilage of those cans containing thermophilic spores for the same reasons as those given for undercooled can spoilage.

How to Get Rid of Them

In all probability, no method will ever be devised for keeping the few raw product and added ingredient thermophiles from entering the plant, but these few organisms can be kept under control by keeping all plant equipment clean, and keeping the product and equipment either too hot or too cold for growth.

Sterilization of equipment is an excellent way to get rid of all bacteria; but, with few exceptions, sterilization is not possible. A contaminated filler can be scrubbed, lowered into a retort, and sterilized for an hour, guaranteeing freedom from all bacteria, thermophiles included. This is obviously



ORDERLY arrangement of processing equipment simplifies cleanup procedures.

impossible for larger pieces of equipment.

Steam hose "sterilization" frequently does more harm than good. In the first place, live steam at the open end of a steam hose is far from the temperature of the steam applied, and will not destroy most thermophilic spores. And in the second place, using a steam hose warms the equipment, and may conceivably bring it into the growth range. Despite this, steam hose cleaning is a step in the right direction, provided that it is followed by sufficient cold water to reduce equipment temperature. The steam pressure will effectively remove accumulated bacteria-containing debris and juices. High pressure water may be equally effective, and more so in the case of starchy materials.

Chemical detergents in the cleanup are useful in removing bacteria-containing films, but the effect of the chemicals on thermophiles is doubtful. A recently developed method is startingly effective and surprisingly simple. Following the usual cleanup procedure, the equipment is flooded with water from every available hose and inlet for 24 hours or longer, with the machinery in motion (if so constructed).

The dilution factor afforded by this method accounts for part of the reduction, but another theory has been advanced to explain the phenomenal reduction achieved. It is believed that spores, after initial activation by heat, continue to germinate long after the stimulus has been removed, and that they will die off in this cleanup method when they reach the vegetative condition because of lack of food supply. Regardless of the validity of the theory, the method does work, and if used repeatedly has a remarkable effect on cleaning up severely contaminated hot equipment.

Removing thermophiles from added ingredients is beyond the control of the canner. Boiling sugar sirups may readily kill non-resistant bacteria, but will not affect thermophilic spores. If the sugar, starch, or other added ingredient contains spores on arrival at the plant, the number of spores found in subsequent operations will increase as shown previously. To limit the increase, maintain boiling temperatures, or temperatures below 100 deg. F., at all times. Frequently, the temperature in the mixing tank, brine line, pump, or brine filler will drop into the thermophilic growth range. During the war years, when certified canners' sugar or starch was unavailable, it was frequently observed that one of two canners using the same sugar source would have extensive spoilage attributed to faulty brine handling, whereas the other might be completely free from spoilage.

Once spoilage has been traced to the brine, this procedure might be followed: After a thorough scrubbing of tanks, pumps, and filler, flush the entire line with machinery in operation; remove old brine pipes and, if severely pitted or rusted, replace them. Flushing with a detergent, followed by thorough fresh water flushing will aid in removal of dirt deposits.

Preventing Build-up

Essentially, the two methods for the prevention of thermophilic build-up in the plant are maintaining equipment temperatures above or below the growth range, and preventing an accumulation of dirt, slime, or scale deposits. Specific applications of these methods to the equipment previously noted as possible sources of build-up follows:—

Blanchers — During operation and short shutdown periods, temperatures should be maintained above 160 deg. F., and preferably above 180 deg. F. During long periods of inoperation or overnight, temperatures should be maintained as low as possible, and in any event, never above 100 deg. F. Replace defective steam valves to prevent gradual temperature rise during shutdowns; and, as an additional safeguard, allow a thin stream of cold water to flow through the blancher overnight.

If the blancher has been found heavily contaminated, flood with cold fresh water following the usual cleanup, with reel in motion, for at least 24 hours. During operation, sufficient fresh water should be provided at the inlet to prevent build-up. Never attempt to re-use blancher overflow water. Open bottom drains frequently to remove accumulated sludge. Cut off excess pipe to eliminate non-flush connections.

Blenders—See "Mixers" below.

Brine Lines—Flush with fresh water with machinery in motion before and after operation. It is good practice to renew all brine lines every two years or sooner if corroded. Maintain boiling temperatures at the filler during operation and short shutdowns. The bottom filler drain plug should be removed after the night cleanup period and while flushing before operations.

Brine Tanks—Replace all wooden tanks with metal or glass-lined tanks. Rust accumulations can be prevented by daily polishing. Never allow the brine temperature to fall between 100 to 160 deg. F. during operation or shutdowns. It is a greater ultimate economy to dump partially filled tanks than to hold them overnight. The danger of holding overnight is lessened by rapidly cooling the brine to 50 deg. F. or less, but a valved connection is required so that brine lines below the tank can be flushed thoroughly. It is safer to leave the brine tanks clean, cold and empty overnight.

Conveyors—If subject to dripping from overhead equipment, drip guards should be installed over conveyors. Greater care should be given to the cleanup of hot conveyors since there is the possibility that growth may occur in the conveyor crevices.

Fillers—Where possible, fillers should be dismantled for thorough cleaning, and left cold overnight. If steam hose cleaning is utilized, it should be followed by thorough cold water flushing. If possible, keep fillers cold during operation; if a hot fill is required, do not allow the product to remain hot in the hopper during shutdowns regardless of their duration. Whenever operations permit, hot fillers should be flushed with large volumes of fresh water. Should the filler be found contaminated, dismantle, scrub and lower into the retort for an hour's sterilization. Rubber connections and gaskets should of course, be removed first. Grind smooth all fractures, and braze or weld any cracks. Cracks on the hopper should be sealed to eliminate dripping into the cans or brine.

Flumes — Never recirculate flume water; and if possible, flume with cold water only. In constructing new flumes, avoid complicated by-passes, locks, baffles and joints. Foam should be removed as it is formed. As with other equipment, leave clean, cold and empty overnight. Slime formations must be removed immediately.

Foam—When foaming is unavoidable, the foaming equipment should be so located that it will not contaminate the product or other equipment adjacent or below.

Mixers—Cold water soaking will usually loosen starch films so that they may be scrubbed free from the paddles and shell. Various detergents will assist in starch removal. Mixers should be left clean, cold and empty overnight. Leaking steam valves should be immediately corrected or replaced. Should contamination be traced to the mixer, clean thoroughly and follow with a

(*Continued on page* 198)

EQUAL WEIGHTS of cranberries and water are cooked five minutes in a steam jacketed kettle. Fruit is then cooled rapidly.

WATER LOST in cooking is replaced and sauce is pureed in a conical, screw-expeller type pulper, with an 0.033-in. screen.

How Jellied Cranberry Sauce Is Preserved by Freezing

Cranberry sauce can be packaged in paper and frozen. A new process, with advantages over the conventional method, has been developed for preparing the gel. Application is foreseen for other gels made from various fruits

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DUE to the acute tin shortage during the war, cranberry sauce could not be packaged in tin cans. Consequently, the Western Regional Research Laboratory determined whether the sauce could be packaged in paper and then preserved by freezing. It was learned that while whole cranberry sauce could be packaged and preserved, the texture of frozen jellied sauce was not acceptable. Work was then concentrated on difficulties involved in successfully preserving jellied cranberry sauce by freezing. When these were eventually overcome, it was found that the new process which had been evolved had many advantages not only for cranberry gel, but also for gels made from a wide variety of fruits.

The new process has several advantages over the method usually employed in preparing sauces. Color and flavor are superior and are better retained during storage. Syneresis can be held to any level desired, with little or no effect on gel strength. The process is well adapted to continuous production, the advantages of which are described by Reich[1]. The paper package is relatively inexpensive and its light weight is an advantage in transportation.

The cold process has been described by Baker and Goodwin, who used it in investigating pectin decomposition and sugar inversion during preparation of cranberry jellies[2,3]. They preserved their product by heat-processing and did not add pectin. Since the jellies used were not frozen, these investigators probably did not encounter the high syneresis observed in this investigation. Baker and Kneeland reported that maximum jelly strength was obtained when the sugar-to-cranberry juice ratio was approximately 40 to 60[4].

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**Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Dept. of Agriculture.

TABLE I—Influence of Added Pectin in Cranberry Gels

Sample number	Syneresis, percent		Penetration (in 0.1 mm.)	
	No added pectin	0.30 percent added pectin	No added pectin	0.30 percent added pectin
1	12	9	201	195
2	15	8	212	197
3	20	10	213	197
4	21	8	213	203
5	21	8	218	206
6	22	10	218	203
7	23	10	220	206
8	27	9	224	203
9	27	10	226	207
10	27	11	226	213
11	29	9	227	207
12	30	9	235	217

Investigations were conducted to ascertain the following: (1) Effect of factors pertaining to gelling the product prior to freezing, (2) significance of variety of berries, (3) response of the product to freezing and storage temperatures, and (4) effect of adding commercial pectin.

Method

Gels were prepared, unless exception is noted, by the following method: Equal weights of cranberries and water were boiled in a steam-jacketed kettle for five minutes, and the fruit was cooled rapidly by running cold water through the jacket while stirring the berries. Water lost during cooking was replaced, and the sauce was pureed in a conical, screw-expeller type pulper, using an 0.033-in. screen. If pectin was not added to the gel mixture, 40 parts of sugar were stirred with 60 parts of puree at room temperature until all sugar was dissolved. The liquid mix was then packaged immediately in waxed paper cups. When pectin was included in the formula, it was mixed with 20 percent of the sugar, and this was mechanically stirred with the puree for 15 minutes. The remaining sugar was stirred with the mix until it dissolved, and the material was packaged. Samples were allowed to gel before freezing.

Gel Strength and Syneresis

Characteristics of the gel most altered by freezing were gel strength and syneresis. Consequently, methods of measuring these properties were devised. Of the instruments used, the most satisfactory one for measuring the gel strength of the puree gel was a penetrometer. Results correlated well with those obtained with a tasting panel. The penetrometer was used in this investigation, therefore, as a measure of the gel strength. It measures (in tenths of a millimeter) the depth of penetration of a cone into the gel in a 5-sec. test period. Any range of penetration values recommended as best is arbitrary, but 190 to 235 is suggested as the approximate desirable range.

Syneresis of gels was measured by placing a 100-gram mold of solidly frozen gel on a screen platform placed in a 250-ml. weighing dish and, after 24 hours of standing at room temperature, weighing the liquid in a dish, together with that wiped from the screen with filter paper. The amount of syneresis was expressed as a percentage of the original weight of the gel. Syneresis of approximately 8 to 12 percent, under the test condition, was considered desirable. This is approximately one-half the amount found in commercially canned sauces.

The relative viscosities of the clear extracts, obtained by centrifuging the purees, were obtained with an Ostwald viscosimeter at 77 deg. F.

Gels Without Added Pectin

It was necessary for the product to gel prior to freezing, because freezing prevented gelation. Five days' storage at room temperature was required to obtain maximum strength and minimum syneresis of most of the gels prepared without added pectin. When the gels were prepared with more concentrated purees, shorter periods were satisfactory.

The best temperature range for holding mixtures during gel formation was 70 deg. to 80 deg. F. Below 70 deg. F., the gel structure formed more slowly. The mixture gelled rapidly at 100 deg. F., but at this temperature gelation was accompanied by considerable syneresis.

Gels prepared from Howe, Early Black, and McFarlin berries did not differ significantly in gel strength or syneresis. All were satisfactory in gel strength, but they had almost twice as much syneresis as was considered desirable when they were prepared with the usual proportions of water and without added pectin.

Freezing and storing the berries in their original boxes for six months at 0 deg. F., prior to making the gels, had no influence on penetration or syneresis values of the gels if the moisture lost from the berries during storage was replaced. Similar storage of purees in tight containers markedly decreased the viscosity of the clear extracts centrifuged from them, but had no influence on the gel strength or syneresis of gels prepared from these purees.

Cooking the berries for 3, 5, 10, or 20 minutes prior to pureeing, had no influence on penetration or syneresis values of the gels. If they were cooked for 20 minutes, marked deterioration in color and some loss in flavor of the gels took place.

Some purees were prepared from berries that had been cooked on trays in steam for one and two minutes, and from berries boiled with water for five minutes. Steaming for one minute did not extract sufficient pectin[5]. Purees from the 2-min. steam and 5-min. boil were similar in pectin content, and the gels prepared from them had similar penetration and syneresis values. By steaming berries two minutes, only 223 mg. of tannin (as tannic acid) per 100 g. of puree were extracted[6]. With a 5-min. boil, 350 mg. of the tannin were extracted. Boiled berries tasted considerably more bitter than steamed berries. Steaming has several production advantages. No special equipment is required to cool the cooked fruit. The thin layer of berries on the tray cools quickly in air, and the addition of cold water to the puree cools it to a temperature suitable for dispersion of the pectin. In addition, only one-half the volume of material must be pureed. This is an added advantage, if the puree must be stored for future use. The steaming procedure was not satisfactory for frozen berries, because they disintegrated, and considerable juice drained through the trays after the berries were steamed for only one minute.

Gels With Added Pectin

Gels, without added pectin, were frozen and stored in still air at 0 deg. F. and -30 deg. F., and compared with gels frozen under air blast at -10 deg. F. and stored at -10 deg. F. The 0 deg. F. samples showed higher syneresis, especially after prolonged storage, than the other two samples. Later it was found that the addition of pectin decreased these differences.

Addition of pectin to the gel

mix was investigated as a possible means of obtaining satisfactorily low syneresis, while including in the gels as much water as is ordinarily used in commercially canned sauces. Unless exception is noted, rapid set, grade 185, citrus pectin was used.

One day of holding prior to freezing gave satisfactory strength and syneresis for gels containing added pectin. With short periods, gels usually were weak and had high syneresis. No significant change in either value was noted between one and five days' holding.

In preliminary trials, in which varying quantities of pectin were used, 0.30 percent was found to be the most desirable amount for several samples. A series of gels representing the entire range of syneresis value obtained in the gels without added pectin was prepared, therefore, with the 0.30 percent of added pectin. Syneresis of gels without added pectin varied from 12 to 30 percent, while those with added pectin varied only from 8 to 11 percent. Consequently, syneresis of widely different gels was brought within the desirable range.

Addition of pectin to gel mixes slightly decreased the penetration values of all the gels. This change was of little importance because gel strengths of all samples, both those with and those without added pectin, were within the desirable range.

Lots of rapid-set, high grade (177, 185, and 202), citrus pectins were tested, using 0.30 percent of the pectin. All were satisfactory. The 202-grade pectin was slightly more effective in controlling syneresis than the other two grades. If 150-grade pectin is used, about 0.35 percent of the formula weight is required.

Some gels were prepared with rapid-set, apple pectins and with slow-set citrus and apple pectins. Results were not uniform. Variations in dispersability and the ash content of the pectins were related to the non-uniform results. Further work is necessary before these pectins can be recommended for cranberry gels.

Although syneresis of gels prepared without added pectin had decreased quite uniformly as strength increased, this relationship did not apply to gels containing added pectin. In the latter instance, syneresis remained practically constant, despite variation in gel strength.

The low percent of precipitation of the added pectin explains, at least partially, how the added pectin decreases syneresis. The percent of pectin precipitation in gels, both those with and those without added pectin, was estimated by determining pectin content and relative viscosity of the liquid which drained from the cut gels. Approximately 90 percent of the cranberry pectin, and only 50 percent of the added citrus pectin, precipitated under existing pH and sugar conditions (pH 2.6 and soluble solids 43 percent). The relative viscosity of the drained liquid increased from 10 for the gels containing only cranberry pectin to 17 for those containing 0.30 percent added citrus pectin.

Partially hydrated pectin in the liquid might decrease syneresis in several ways. It would increase the viscosity of the liquid, which would then escape less readily from the interlacing gel structure. Also the more viscous liquid may form smaller ice crystals, which would tend to decrease leakage.

Method for Preparing the Gel

1. Steam the berries on trays for two minutes and cool on trays to at least 125 deg. F.

2. Puree the steamed fruit (waste about 15 percent of the weight of the berries) and add 118 lb. of water to 100 lb. of pureed berries. Equal weights of berries and water may be boiled for three minutes in a steam-jacketed kettle, partially cooled, pureed, and cooled to approximately 80 deg. F.

3. To 100 lb. of puree containing the added water, mix 0.42 to 0.58 lb. of rapid-set, 150-grade, citrus pectin (the quantity depending on the quantity and quality of pectin present in the cranberries) with 13 lb. of the sugar. Stir the pectin-sugar mixture with the puree at room temperature for 15 minutes to dissolve the pectin. (Added pectin is 0.25 to 0.35 percent of the weight of the entire formula). Add 53.7 lb. of sugar to the puree-pectin-sugar mixture and stir until all of the sugar dissolves. The total added sugar-to-puree ratio is 40 to 60.

4. As soon as the sugar is dissolved, package the liquid mix in heavily waxed paper cups and allow to stand at 70 deg. to 80 deg. F. for approximately 24 hours. During this time, the gel structure forms and strengthens.

5. Freeze the gel and store it at 0 deg. F., or lower.

6. Defrost just before serving.

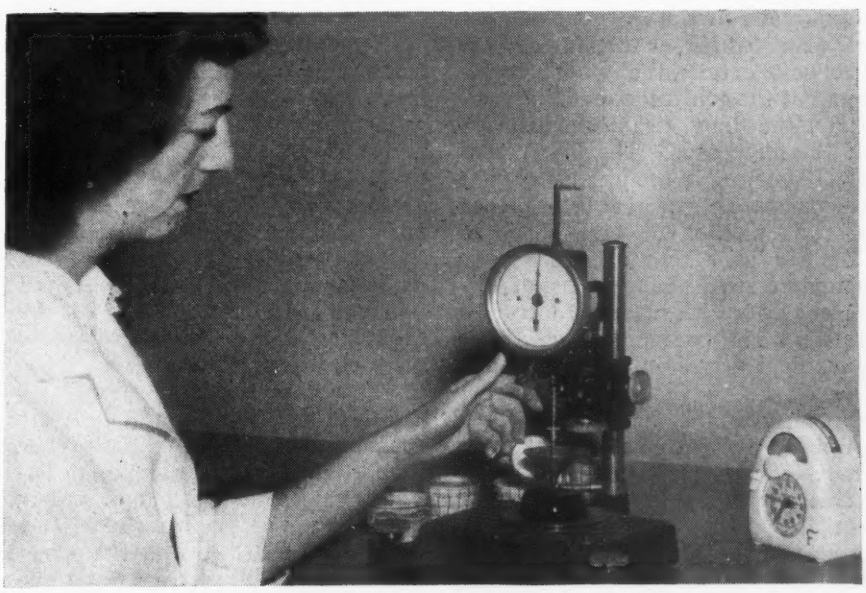
The yield from 100 lb. of cranberries (85 lb. of pureed cranberries), 100 lb. of water, 123.3 lb. of sugar, and 0.8 lb. of pectin is 309 lb. of gelled sauce.

Summary

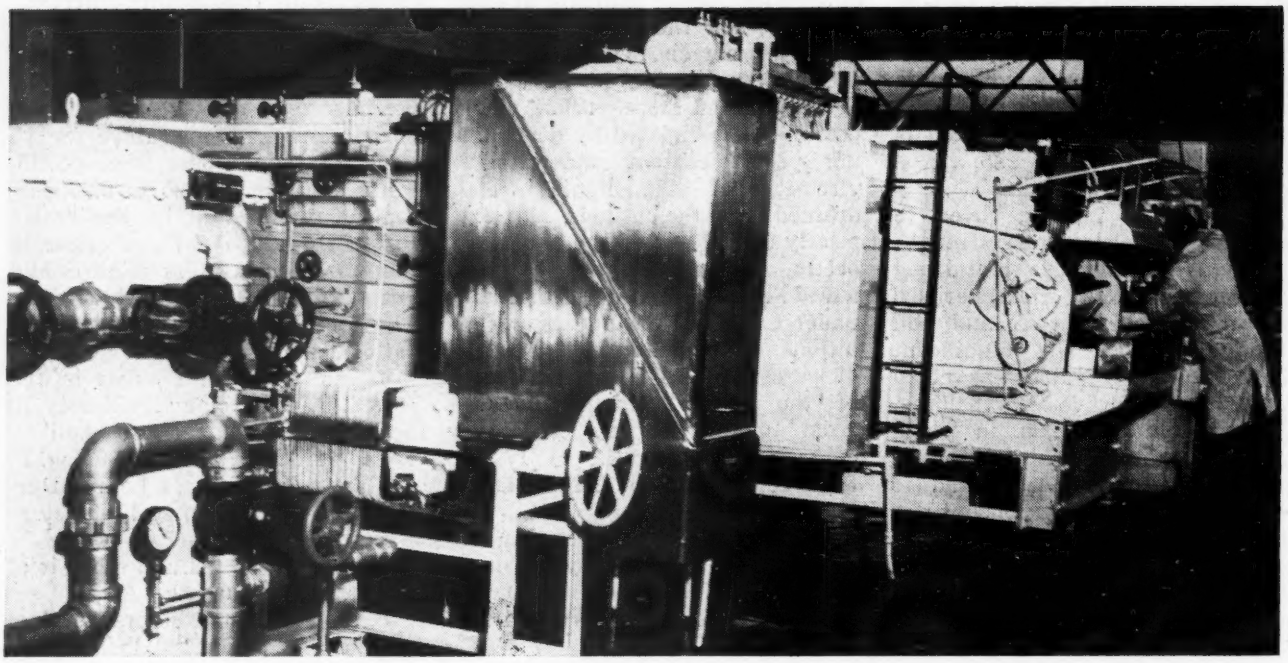
A method of preparing jellied cranberry sauce, without extensive heating, and preserving it by freezing temperature has been described.

Freezing weakened the gel structure and seriously accentuated syneresis of the gels if they were prepared without added pectin. Frozen gels, containing 0.25 to 0.35 percent rapid-set, high grade, citrus pectin, were entirely satisfactory in strength and syneresis. The fact that only 50 percent of the added pectin was precipitated under the

(*Continued on page* 204)



THE PENETROMETER method is the most satisfactory way to determine the gel strength of the puree gel. It measures the depth of penetration of a cone into the gel in a 5-second test period.



PLANT LAYOUT for beverage bottling shows (left to right) sand filter, asbestos pad filter, bottle washer and filler.

Testing Commercial Pads

The efficiency of asbestos filter pads in providing sterile water and

By SAMUEL S. EPSTEIN
Vice-President and Chemist
Kirsch's Beverages, Inc.
Brooklyn, New York

MANY food plants are obtaining sterile water by using sheet filters. Sheet filters are also used by some plants for obtaining sterile, liquid food products. Sterilization of plant water or of liquid food products entails the proper treatment of the equipment and, particularly, the daily steam sterilization of the filter pads. The first essential, however, is the assurance that the pads are of the quality to render a sterile filtrate.

Filter pads that are used with commercial sheet filters are of different porosities. The filtration rate of city water through filter pads may vary from 100 to 900 gal. per sq. m. per hr. Flow rates of sugar solutions and liquid food products are not as rapid as water flow. They are more or less inversely proportional to their viscosities.

Sterilizing filter pads normally have city water flow rates of less than 150 gal. per sq. m. per hr. An industrial user of filter pads should be interested in a laboratory test which will assure him of the biological character of his filtered product. The technic herewith described can be used by the food and beverage laboratory as a routine test for controlling the quality of filter pads.

A filter pad which tests positive is of the quality that should render a sterile filtrate. The sheet filter must be adequately steamed prior to daily use.

In the normal operation of a commercial sheet filter, the differences in the pressures registered by the gages at the inlet and at the outlet decrease with usage. This is due to the progressively increased resistance to filtration by the accumulation of non-filterable materials on the filter pads. If one pad in a sheet filter leaks, then the liquid will squirt from the side of the filter. In addition, pressure at the filter outlet increases because there is less resistance to filtration.

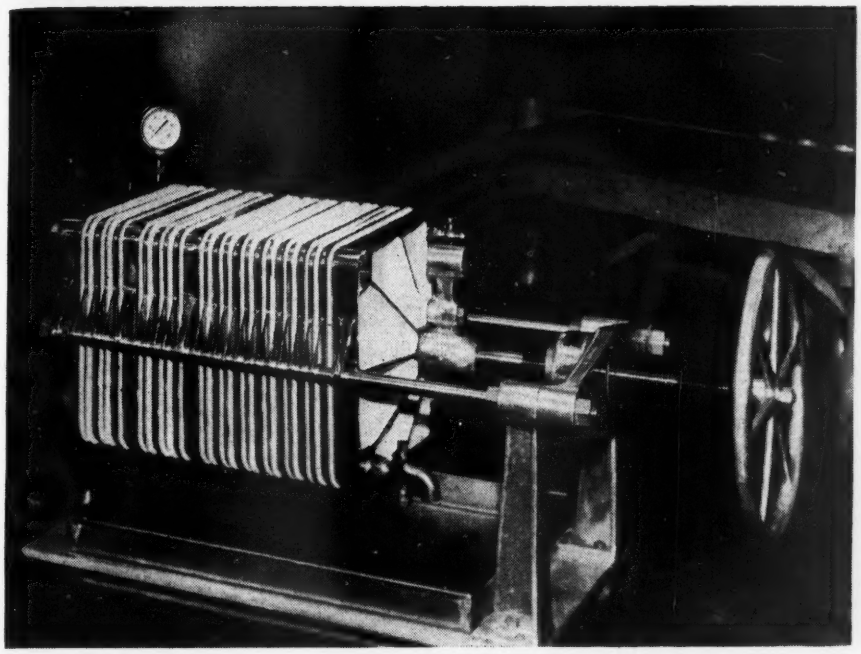
A leaking pad results in a filtrate containing a portion of non-sterile liquid. For example, suppose a liquid has an agar-plate count of 100 microorganisms per ml. When this liquid is filtered through a sheet filter with 19 perfect pads and one leaking pad, the filtrate will contain four to eight microorganisms per ml. Such results can be anticipated, because each filter pad in a sheet filter operates as an individual filter.

The occurrence of leaking filter pads can be avoided by careful inspection when preparing the sheet filter. If a pad develops a leak, it must be replaced, and the entire sheet filter must be sterilized with steam.

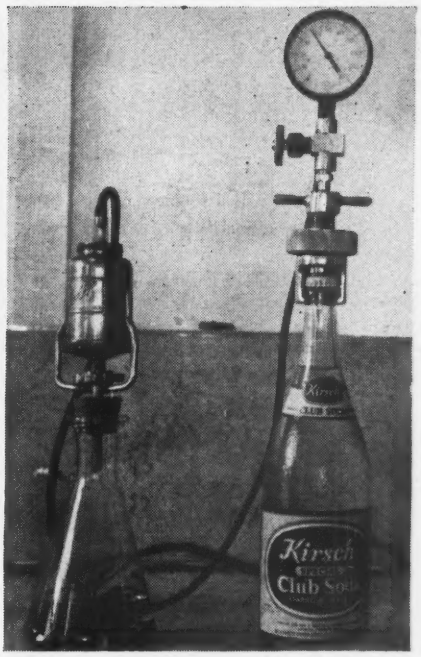
A simple technic is used to test commercial filter pads, designed for sterile filtration. The test involves the use of a small Seitz laboratory filter (100 ml. capacity), test pads cut to 60 mm. discs, a small vacuum pump or a gas volume testing gage, lactose broth in Durham fermentation filtering flasks and a water suspension of an agar-slant growth of a test bacterial culture.

Test Culture

The test organism selected is *E. Coli.* It is customary to use a 48-hour agar slant culture of *E. coli.* Older cultures, held at refrigeration temperature, also give satisfactory results. A suspension is made of the growth by adding about three ml. of physiological salt solution into the tube, scraping off the growth with a platinum loop and then mixing by rolling the tube between the palms of the hands. The bacterial suspen-



FILTER PRESS assembled with exchange heads and three types of pads.



LABORATORY filter (pressure type).

Used For Sterile Filtration

liquid foods can easily be determined by a simple bacteriological test

sion is then diluted by adding one ml. of the suspension to 500 ml. of tap water. The mixture is finally well shaken. After making serial dilutions, total colony counts should exceed 1,000,000 per ml.

Test Broth

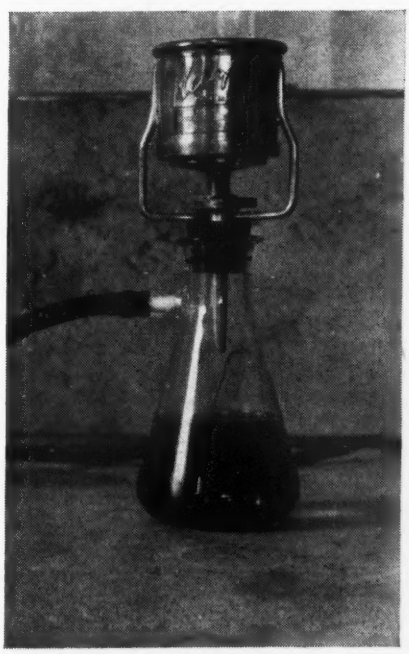
Lactose broth is made up with 0.35 percent beef extract, 0.60 percent peptone and 0.60 percent lactose, and dispensed into filtering flasks containing small inverted test tubes. The protruding sleeve of the filtering flask is plugged with cotton. This arrangement provides a Durham fermentation flask and permits detection of gas formation by the test organism. With 250 ml. filtering flasks, 150 ml. of lactose broth are used. With 500 ml. flasks, 250 ml. of lactose broth are used.

Test Apparatus

A large commercial pad is removed from a carton, and cut into 60 mm. discs. One disc is fitted into a 100 ml. capacity model Seitz laboratory filter, smooth surface toward the filter outlet. The filter is inserted into the filtering flask containing lactose broth and the entire apparatus is sterilized for 15 minutes at 15 lb. pressure.

When a vacuum-type laboratory filter is used, the protruding sleeve of the filtering flask is connected to a short filter pump by means of rubber tubing. Suction is provided by connecting the filter pump to a running water tap.

When a pressure-type laboratory filter is used, pressure is provided by escaping carbon dioxide gas from carbonated water or beverages. One end of a rubber tube (three mm. internal bore) is connected to the valve of the filter and the other end to the exhaust sleeve of a bottler's gas volume test gage. The gage is then inserted into a bottle of carbonated liquid by means of a protective clamp. Pressure can be regulated by shaking the bottle and adjusting the exhaust valve.



LABORATORY filter (vacuum type) used with ordinary suction pump.

Making the Test

A 50 to 65 ml. suspension of *E. coli* is added to the filter, and filtered either by suction or pressure. Pressure filtration is preferred because practical pressure information is available. For example, water is usually filtered at pressures between 20 and 30 pounds per square inch. Certain flavoring extracts, on the other hand, are filtered at pressures less than eight pounds per square inch.

The test broth is then incubated at 37 deg. C. for 48 hours to test the sterility of the filtrate. In most instances growth occurs within 12 hours when the filtrate is not sterile. When growth occurs, the broth is cloudy and the inverted test tube

(*Continued on page* 198)

INSTRUMENT used in a paper testing laboratory to measure the stretch of papers.

Marathon Corp. photos

PAPER TESTING machines. (Left to right) Tear tester, densometer, Mullen tester, dead weight Mullen gage tester, Schopper fold tester and wax tensile tester.

How To Equip And Organize A

Select proper personnel, equipment and location for the laboratory. Handle your problems systematically

By JOHN V. ZIEMBA
Assistant Editor
"Food Industries"

IN setting up a food packaging laboratory, it is important to know where it must be located, how to organize it and what personnel to employ. The equipment and facilities required for the packaging laboratory will be influenced by the size of the plant and the type of products manufactured. Next, the company must set up a policy as to how packaging problems must be handled—how the problems must be taken up, assigned and finally investigated by the packaging laboratory.

It is not enough to work out packaging problems. After problems are completed, reports must be issued. It is important to know to whom the reports should be submitted. The packaging laboratory must also set up material and performance specifications for purchasing and production departments.

The packaging laboratory must be set up reasonably close to production and purchasing departments, preferably in the general office. It must also be located close to one of the factories to afford an opportunity of making trial plant runs. On the other hand, it must be far enough from the plant to prevent it from becoming a control laboratory.

If possible, control work should be kept out of the packaging laboratory and placed within the production plant. In some cases, however, depending upon the plant, it may be necessary to set up the packaging laboratory so that it is accessible to the control laboratory to avoid duplication of equipment. Or it may be necessary to include the control laboratory in the packaging laboratory.

The packaging laboratory in small plants usually reports to the director of research and development. In large plants, however, it may report to top management through the packaging committee. It is never advisable for the packaging laboratory to report to sales, purchasing or production departments.

Organization of a Laboratory

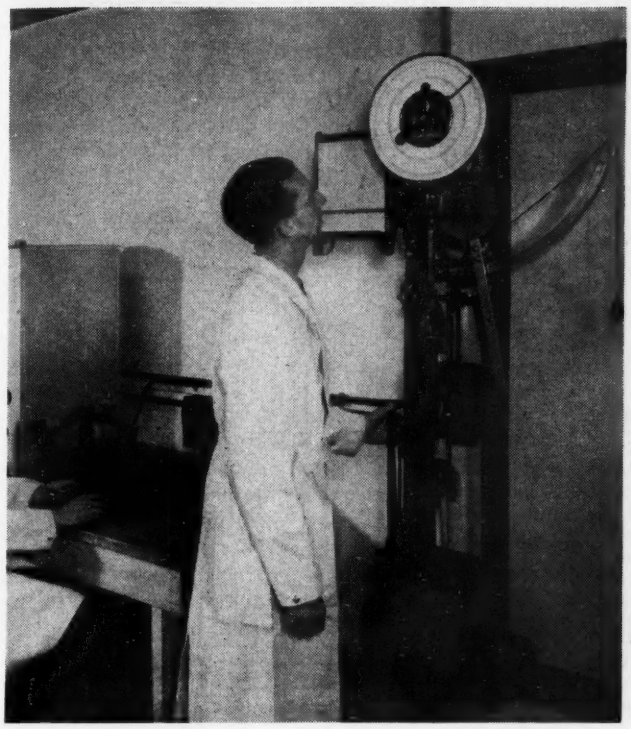
The packaging laboratory is a part of the research and development department. Its size depends upon the size of the company. Small companies can operate satisfactorily with one man in the packaging laboratory. With larger companies, the number of personnel and the size of the laboratory will be larger. The larger laboratories may be divided into two sections:

1. A routine laboratory for controlling all packaging materials used.

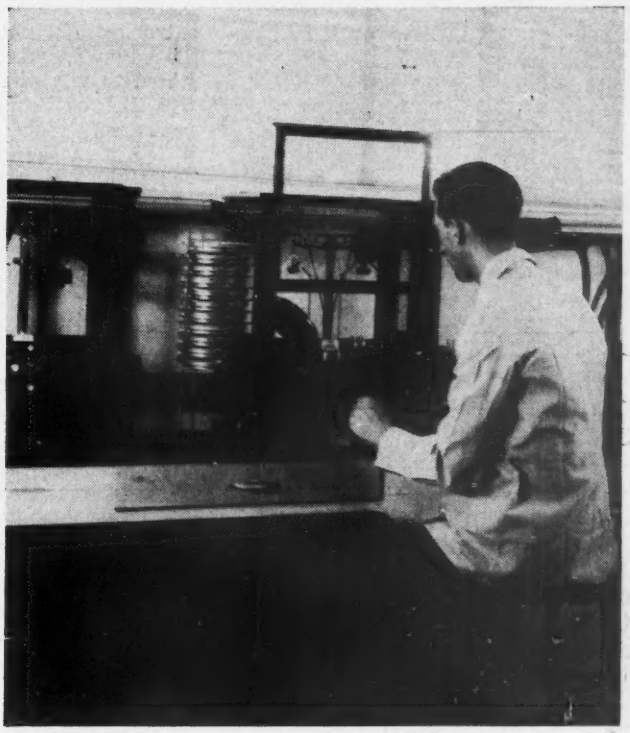
2. A research and development laboratory, engaged in problems not under routine control.

In large meat packing plants, for example, the packaging laboratory

This is the second of a series of articles to appear in Food Industries on a food packaging laboratory. The first article, printed in the July issue, pointed out the need of a packaging laboratory in small as well as in large plants. Steps necessary to organize and equip a packaging laboratory are taken up in the present article. The final article, to be published next month, will show how food packaging laboratories operate.—The Editors.



TENSILE STRENGTH and elongation being measured on papers used for food packaging. Instrument is a Scott tester.



Shellmar Products Corp. photos

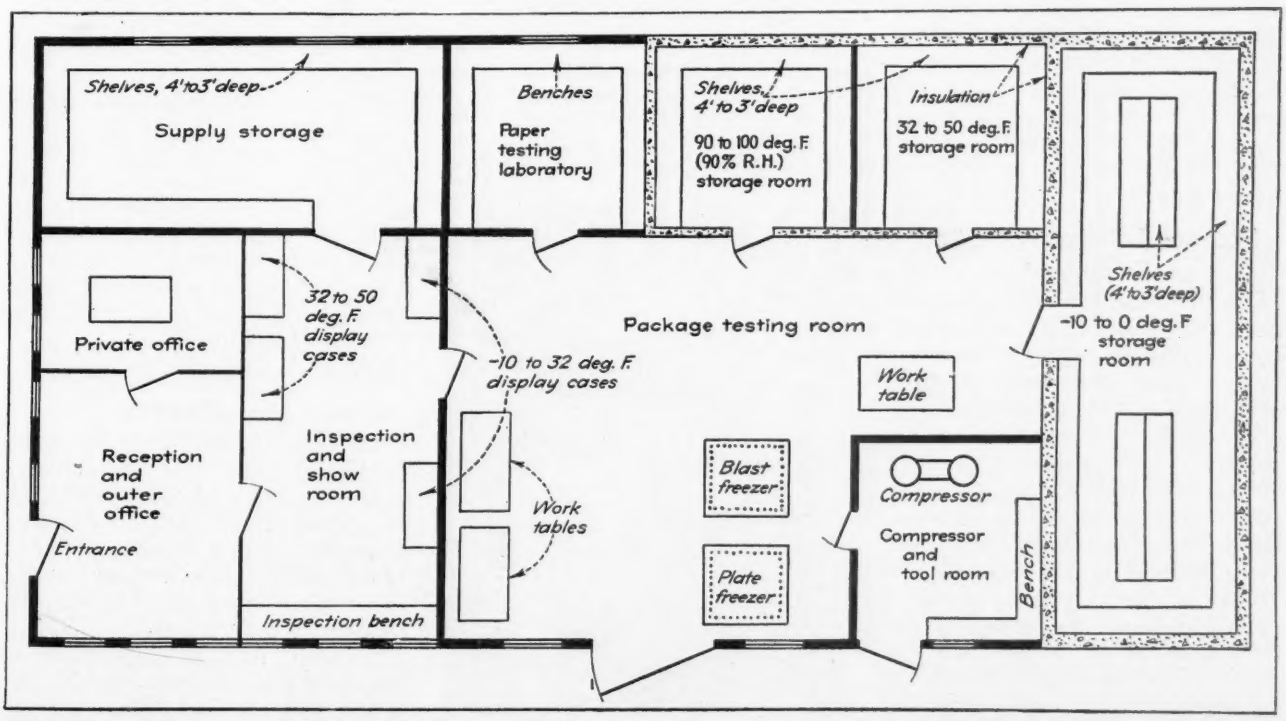
MOISTURE-VAPOR permeability of papers is determined by weighing test dishes from a General Foods cabinet.

A Packaging Laboratory

may be subdivided into fresh meat, frozen meat, dairy and poultry departments and a paper testing laboratory. The latter may serve as the control laboratory.

Colleges do not graduate food packaging specialists. Only a few colleges have a semester course in food packaging.

Personnel, selected for the food packaging laboratory, must include technical and non-technical assistants. A technician, experienced in packaging or paper chemistry, should head the department and su-



SCHEMATIC LAYOUT for packaging laboratory to study problems of packaging limp perishables in a large factory. Small plants with fewer problems can get along with considerably less space, but need essentially the same facilities.

pervise packaging research and development work.

Technical assistants must be qualified chemists with a good background in physics and food chemistry. Personnel are also recommended with previous experience in food or non-food packaging or in related fields, such as adhesives, packaging materials, packaging machinery or paper and pulp. Managements in some food processing plants prefer technicians with knowledge of packaging rather than straight food technology. They feel that food experience is unnecessary, since complete knowledge of the products manufactured will be learned in time.

Non-technical personnel can be employed to conduct routine tests under supervision. Some routine tests, however, must not be handled by non-technical help because they are not sufficiently critical.

For example, when ream or basis weight tests are to be made of waxed paper under humid conditions, they must be conducted by technical personnel. Otherwise thousands of dollars worth of paper may be rejected due to the inability of most non-technical help to interpret results properly.

The following will illustrate the need for competent technical testing:

In determining the weights of the wax and the base sheet, wax is first washed off the base sheet with the solvent, carbon tetrachloride. When the base sheet is permitted to dry under humid conditions, it picks up moisture and weighs more than normally. The wax, on the other hand, appears to weigh correspondingly less. Results are easily misinterpreted by non-technical help and inaccurately reported to the purchasing department and supplier.

Package Laboratory Testing Equipment

Equipment and facilities required in a food packaging laboratory will depend upon the products manufactured. These may include equipment necessary to prepare the product prior to packaging, packaging equipment and equipment to simulate or accelerate conditions after the packaged food has left the plant. General equipment required in most food packaging laboratories includes:

1. Packaging room with sufficient table space to permit packaging of samples. The room could be equipped with ultraviolet lamps to reduce contamination of samples during packaging.

2. Vibrator to simulate vibration in a truck or freight car. Packages are placed on the vibrating plate and subjected to vibration for seven days to test the seal and tightness of the packages.

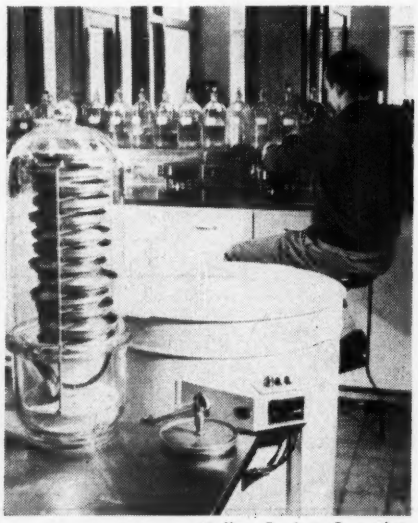
3. Automatic heat sealer with three adjustable features—time, temperature and pressure. By adjusting the time, pressure and temperature of the heat sealing plates when in contact with heat sealable material, the heat sealability of the wrapper can be determined accurately.

4. Cyclone storage cabinet to accelerate chilling and sweating of packages. Packages may be set in the cabinet to chill and sweat at any suitable cycle such as 12 hours at 40 deg. F. and 12 hours at 100 deg. F. The cabinet may be built using a refrigerator with an automatic control and regulator unit manufactured by Central Scientific Co. (catalog 46041).

5. Walk-in-humidity cabinets. Any number of cabinets may be used, depending upon the product and conditions to which packages will be subjected after they leave the plant. One cabinet may be used with temperatures of 85, 90 or 100 deg. F. and relative humidity of 90 percent. The same temperatures and a lower relative humidity (20 percent) may be used in the second cabinet. A third cabinet, operating at 125 deg. F. and uncontrolled relative humidity, can be used to accelerate aging or the appearance of rancidity. A cabinet is available in which the relative humidity can be regulated from 15 to 88 percent and temperatures from about 70 to 350 deg. F.

6. Viscosimeters for testing the viscosity of thick pastes and thin adhesives. Adhesives must have the correct viscosity or packaging machines will fail to function properly. For example, if adhesives are too thick, the paste roller will not be properly supplied with the adhesive and little or no adhesive will be applied to the label, carton or end seals. On the other hand, if the adhesive is too thin, it will flow into and subsequently freeze the gear of the paste roller after the machine has stopped.

7. Analytical balance and Wink apparatuses for determining the moisture equilibrium curves on the foods to be packaged.



Shellmar Products Corp. photo

WATER-VAPOR transmission testing cabinet (General Foods) and test dishes.

Other Equipment

Essential equipment in the fresh meat, fish and produce packaging laboratories include: (1) Coolers with adjustable temperature and humidity controls to simulate plant or warehouse storage, (2) 90 to 100 deg. F., high humidity rooms to simulate maximum loading and unloading conditions at railroad sidings and (3) self-service display cases (34 to 50 deg. F.), set up in a 70 deg. F. room.

For frozen food packaging, facilities must include: (1) Freezers (perhaps blast, plate and immersion), (2) a cold storage room (–10 to 0 deg. F.) for storing frozen products which are to be examined periodically, (3) a self-service display case (–10 to 32 deg. F.) and (4) potentiometers for determining product temperatures during freezing.

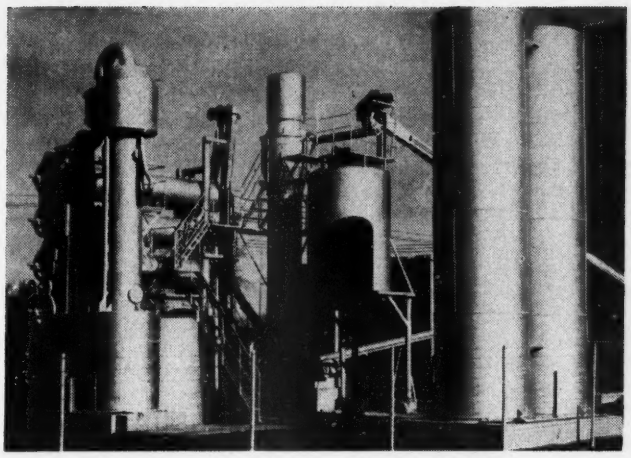
Working room facilities must also be provided. In a large meat packaging laboratory, for example, these may include: (1) Work tables, (2) slicers, (3) electrically operated band saws, (4) tendersteakers, (5) stew meat dicers, (6) grinders, (7) patty making machines, (8) stuffers, (9) molding devices, (10) filling machines, (11) scales and perhaps small weighing machines, (12) small wrapping machines and (13) heat sealers and other small sealing machines.

Some packaging laboratories do not require extensive working room facilities. Samples may be withdrawn from the production line and packaged in the laboratory. In some instances a small portion of the day's production may be packaged with new packaging materials. Samples are then put through performance tests to evaluate the packaging materials and product.

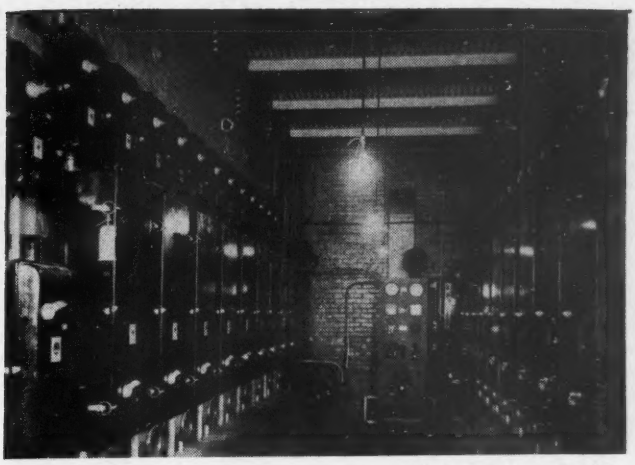
Paper Testing

Instruments are used in paper testing laboratories to evaluate such properties of packaging materials as: (1) Ream weight, (2) bursting strength, (3) tearing resistance, (4) breaking strength and stretch, (5) folding endurance, (6) air resistance, (7) stiffness or rigidity, (8) opacity and printing opacity of white papers, (9) smoothness, (10) brightness of white paper, (11) scuffing of labels, (12) water and

(Continued on page 206)



INSTALLATION of an Anderson Solvent Extraction pilot unit now operating successfully in the Midwest. The two large tanks at the right are used as storage tanks for the oil removed.



The V. D. Anderson Co. photos

PART of the control board located in the expeller press room at Spencer Kellogg & Sons, Inc., mill in Minneapolis. Red lights above each unit stay on until the motors kick out.

Flavor Reversion in Soybean Oil

Flavorless precursors of reversion compounds and trace substances may be responsible for reversion. Light, heat, oxygen, metals, bean quality and variety, and abusive treatment during processing affect flavor stability

By CALVIN GOLUMBIC, Assistant Research Professor, and B. F. DAUBERT, Research Professor
Dept. of Chemistry, Univ. of Pittsburgh, Pittsburgh, Pa.

FLAVOR reversion, a spontaneous and often deleterious change common to many animal, marine, and vegetable fats,[1,2] is characterized by the appearance in refined oils of objectionable flavors and odors, prior to the onset of true rancidity. The term "flavor reversion" probably owes its origin to the early observation that aged bland marine oils develop a flavor and odor reminiscent of the unrefined oil. According to present usage, the term is applied to the appearance of any undesirable flavor which may or may not resemble that of the unrefined oil.

All natural fats and oils undergo oxidative deterioration. The extent is dependent upon the nature and amount of their unsaturated and antioxygenic components. If the oxidative process is allowed to proceed unchecked, organoleptic rancidity supervenes, and thereafter the fat becomes relatively useless as a foodstuff.

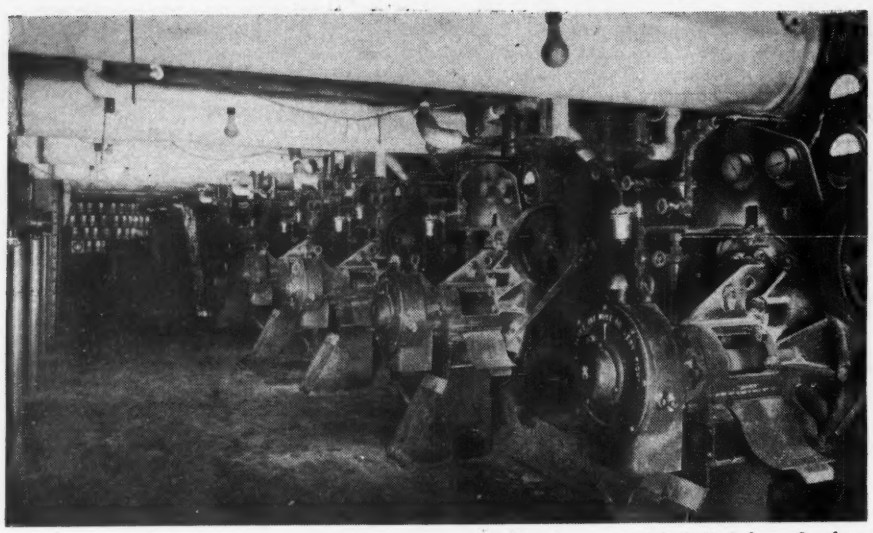
Reversion and rancidification are concurrent processes, but their interrelationship, if any exists, is unknown. Each oil has its own characteristic reversion flavor and odor, whereas the "off" odors and flavors of rancidity are common to all fats.

Reverted flavors and odors in oils such as cottonseed appear after long storage and therefore constitute no special problem for the food handler. A well-processed and bland soybean oil, however, may revert in only a few days at moderate temperatures. This lack of flavor stability is the only serious shortcoming of soybean oil. In all other respects it is a highly desirable dietary fat. It is rich in natural antioxidants and possesses excellent keeping qualities, good consistency behavior, and low bleaching costs. For these reasons, its annual production has shown a steady gain since 1934. Added impetus to its production resulted from the wartime shortage of edible fats, and in 1944 its production level soared to that of cottonseed oil.[3] The problem of its flavor instability, however, has not been entirely solved. Its solution remains of paramount importance to the oil processor and manufacturer of edible fat products, who serve a public accustomed to bland and flavor-stable oils.

Effect on Food Products

The organoleptic test is the only current means of recognizing and evaluating reversion. A subjective method which depends on personal judgment of flavor and odor by a taste panel is undesirable from a scientific viewpoint. In capable hands, however, it gives valuable qualitative information concerning the state of reversion in an oil. The extent to which the organoleptic technic can be refined is amply illustrated by the elaborate taste panel of the Northern Regional Research Laboratory of the United States Department of Agriculture.[4]

The course of reversion in soybean oil is initiated by the appearance of grassy, haylike, and beany flavors which increase in intensity and give rise to the fishy and painty flavors of badly reverted oil.[4] Methods for the accentuation of reversion flavors include: (1) The heat test, in which the oil is heated to 200 deg. C. for varying periods; (2) the oven test, which comprises storage at 60 deg. C.; (3) exposure



The V. D. Anderson Co. photo

BATTERY OF EIGHT of the 27 Anderson Super-Duo Expellers which produce high quality oil and low oil-content meal at Spencer Kellogg & Sons, Inc., Minneapolis plant.

to natural or artificial daylight;[5] and (4) exposure to visible and infrared radiation.[6]

The reverted flavors of hydrogenated and unhydrogenated soybean oil are not entirely similar. It is difficult to assess the shades of difference because the descriptive terms applied to the reverted flavors vary from individual to individual.

Unfortunately, foods containing soybean oil may acquire its unpalatable reverted flavor. Slightly reverted oil may not be recognized directly in the foodstuff, but it leaves a persistent and disagreeable aftertaste.

The average consumer may not be familiar with these effects of soybean oil in cookery, but the large food processors are well acquainted with the reversion phenomenon. Of serious concern to the industry is the flavor instability of hydrogenated soybean oil—a constituent of most shortenings. Hydrogenated oil reverts quite readily under many conditions, such as exposure to bright light or high temperature. Doughnuts, potato chips, or similar foods, made by deep-fat frying or other means requiring strong heating of the oil, acquire the unpleasant fishy or painty flavors and aftertaste associated with reversion. Eggs have such a strong affinity for these flavors that the taste of an egg fried in soybean oil is often employed as a test for reversion.

The cause of flavor reversion in soybean oil is unknown. Since reversion has been observed in many oils, there is a tendency to seek a common explanation of the condition. Our present knowledge of the process, however, is too limited to allow general conclusions to be drawn. Although the hypotheses that have been advanced to explain the development of objectionable flavors and odors in fats are adequately reviewed elsewhere, it is perhaps desirable to mention them briefly.[1,2]

Linolenic Acid and Reversion

Among the various possibilities, linolenic acid is cited most frequently as the causative agent of reversion in unhardened soybean oil. This suggestion is supported by the fact that oils which revert easily, such as soybean, linseed, and the marine oils, contain linolenic or more highly unsaturated acids. The flavor-stable oils do not contain these acids in appreciable amounts. Isolinoleic acid, a preferential reduction product of linolenic acid, is ascribed a similar role in hydrogenated soybean and linseed oil.[7]

The contribution to the reversion process of isolinoleic acids, however, is far from completely understood. Although they may be partly or wholly responsible for the reverted flavors in hydrogenated oils, an explanation for the condition in unhardened oils still remains to be determined. Evidence also has been presented recently to show that unsaponifiable matter present in the oil is a factor in the development of reverted flavor.[8] On the basis of conflicting evidence, it may readily be seen that until the factors contributing to reversion are definitely identified, it will be relatively difficult to prescribe precise methods for its control in the refined oil.

TABLE I—Flavor Comparison of Soybean Oil Before and After Chromatographic Adsorption

Sample	Exposure (in hr.) 0.5 hr.	1 hr.	2 hr.
	Flavor score* after exposure**		
Untreated soybean oil	5.0	3.4	3.3***
Chromatographed soybean oil	9.6	8.8	8.2***
Chromatographed soybean oil	8.0	7.8	
Chromatographed soybean oil + eluate	4.0	4.0	

*The flavor scoring system of Dutton, et al.[12] was employed.

**The oil samples were exposed under nitrogen to visible and infrared radiation[13].

***These samples were diluted 1:1 with mineral oil prior to the flavor tests.

"Reversion" Compounds

Recent work[6] has been directed toward isolation and identification of the substances giving the reversion flavors and odors and the flavorless precursors of these "reversion" compounds. It is doubtful if the quantity of these compounds in a reverted oil exceeds a few parts per million.[9] Nevertheless, it is possible to concentrate them a thousand-fold merely by deodorizing a heat-reverted oil and trapping the entire condensate.

Chemical examination of concentrates of reversion compounds obtained from unhardened and hardened soybean oil showed the presence of carbonyl functional groups.[6] When such concentrates are treated with the carbonyl reagents, sodium bisulfite, semi-carbazide, and trimethyl acethydrazide ammonium chloride (Girard's reagent T), the reversion odors and flavors diminish or disappear entirely.[10] In some instances the flavor-producing reversion compounds can be regenerated.

Although the reversion compounds appear to be trace materials, their precursors in soybean oil are present in much greater quantities. The precursors can be removed in part by chromatographic adsorption of a petroleum ether solution of soybean oil on activated alumina. The data in Table I show that the chromatographed soybean oil has a greater flavor stability upon exposure to light than the untreated oil. Concentrates of the reversion precursors, obtained by elution of the adsorption columns, markedly decrease the flavor stability of the chromatographed oil.

Another approach to the problem has been the study of the flavor characteristics of a simulated soybean oil prepared from highly purified fatty acids of sources other than soybean oil.[9] The flavors which appear in this oil upon exposure to intense light and heat do not resemble those of reverted soybean oil. Hence, it appears from this work that linolenic acid alone is not entirely responsible for reversion.

Much can be done to improve the flavor quality of soybean oil products by minimizing factors, such as the presence of light, heat, oxygen and metals, which accelerate reversion.

Effect of Light

By storage in darkness at low temperatures, reversion can be delayed for a considerable period of time. The freshly refined oil may revert in a few days in diffuse daylight at room temperature and in only a few hours after exposure to light of higher intensity at 50 deg. C.[1] Strong daylight can have a deleterious effect on hydrogenated products stored at ordinary temperatures. Off-odors and flavors, different from rancidity, have been noted in shortenings after a few weeks' exposure to bright daylight.[14] The portion of the visible spectrum between 325 and 460 millimicrons appears to be largely responsible for such changes.[5]

Copper is said to accelerate reversion. Definite information on the promoting effects of different metals is lacking. The pro-oxidant effect of certain metals upon vegetable fats and oils, however, is well known,[14] and any catalyst of autoxidation may also hasten the development of reversion.

Role of Oxygen

The precise role of oxygen in the reversion process is obscure. Unlike autoxidation, reversion cannot be retarded by antioxidants because the oxygen requirement for reversion is very small. Thus, flavor deterioration has been observed in soybean oil aged under inert gases,[9, 13] and high vacuum.[1] Intramolecular oxidation has been suggested as the explanation for reversion under such circumstances. The reverted flavor of soybean oil aged under nitrogen is more disagreeable than that of oil stored in air.[13] This observation may have practical significance, because many edible oil products are packaged under anaerobic conditions.

Variety and Quality of Beans

The quality and variety of the soybeans are important factors in producing the best grades of soybean oil. Field damage to mature soybeans by frost or weathering detracts from the flavor quality of the refined oil.[3] Poor farming practices allowing the entrance of weeds and other foreign matter during harvesting have a similarly deleterious effect. The highest quality of oil is obtained only from clean, sound, fully matured soybeans of the yellow varieties.[3]

Refining Practices

Abusive treatment anywhere in processing, such as during milling, alkali refining, bleaching, hydrogenation, and deodorization, adversely affects the flavor stability of the oil. Excessive refining, hydrogenation, or deodorization temperatures and excessive amounts of bleaching agent or alkali, are also harmful. Solvent extraction, hydraulic pressing, and expeller milling are the methods employed for oil recovery. Of these, solvent extraction gives the best product. In hydraulic pressing of soybeans, the moisture content of the beans must be kept below 12 per cent for best results.[15]

There is general agreement that hydrogenation to iodine values of 50 or lower diminishes the tendency toward reversion. Unfortunately, an oil hardened to this extent is unsatisfactory for edible purposes, unless it is blended with a liquid fat. In the manufacture of shortenings and margarines, soybean oil is usually blended with flavor-stable oils, such as cottonseed, prior to hydrogenation. If the proportion of soybean oil is maintained below a certain critical level, usually 25 to 35 percent, detectable reversion does not occur.[2] This method for masking the reversion reaction has been widely used in industry, particularly for manufacture of highest quality brands of shortenings, margarines, salad and cooking oils.

Effect of Lecithin

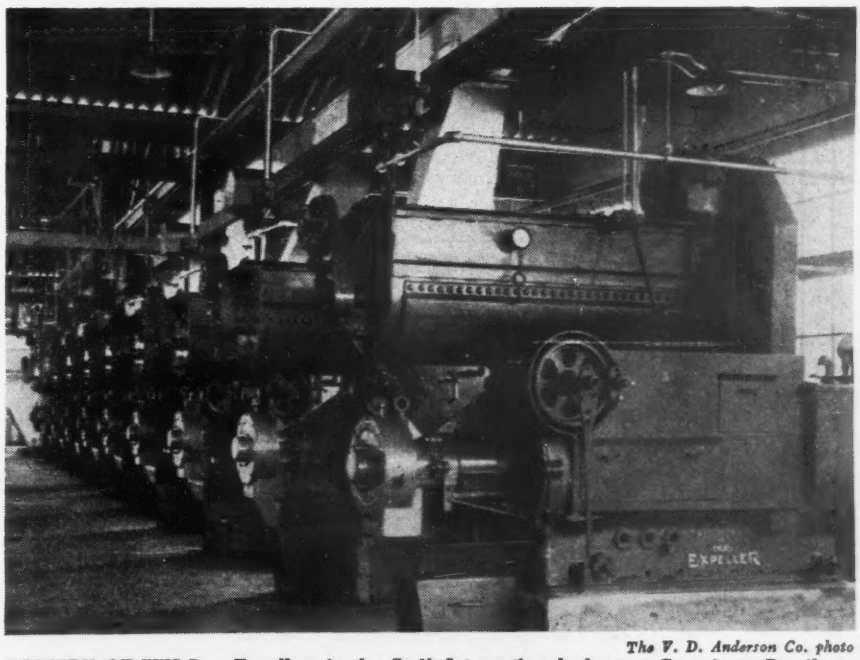
A recent report[16] describes a novel process developed in wartime Germany for increasing the flavor stability of soybean oil. This method based upon the assumption that reversion is caused by lecithin, essentially comprises removal of lecithin from freshly extracted oil by water washing and inactivation of remaining traces by the addition of small amounts of citric acid during deodorization. Tests at the Northern Regional Research Laboratory,[4] using this technic, confirm the claims that elimination of phospholipids improves flavor quality. In this connection, it is noteworthy that phospholipids are believed responsible for the flavor instability of dehydrated eggs.[17]

Other Reversion Controls

Other proposed measures for minimizing the occurrence of flavor reversion include better selective hydrogenation,[18, 19, 20] solvent fractionation for separation of saturated from unsaturated glycerides, selective absorption, improved farming practices, better storage, and improved methods of oil recovery and refining.

During the past decade, the procedures developed in plant practice and in the laboratory have eased the urgency of the problem. In the post-war period, however, soybean oil will be in competition with those stable oils that it replaced during the war emergency. Many observers believe that soybean oil will maintain its leading position only if the problem of its flavor instability is solved. The shortest road to this goal is the isolation and complete identification of the causative agent or agents of reversion.

(*Continued on page* 204)



The V. D. Anderson Co. photo

BATTERY OF TEN Duo Expellers in the Swift International plant at Campinas, Brazil.

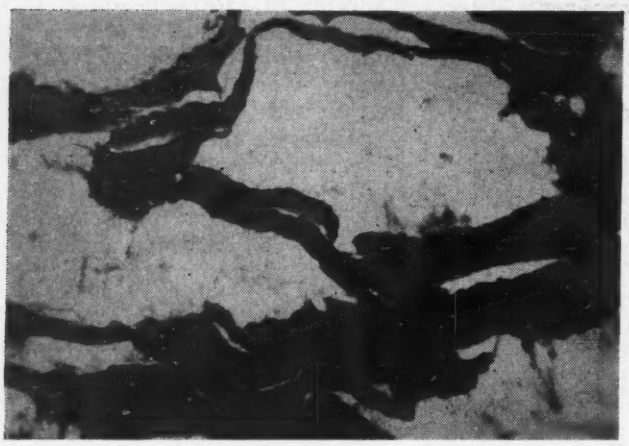


FIG. 1. Longitudinal section of *longissimus dorsi* muscle of beef after freezing at +18 deg. F. and staining. X 150.

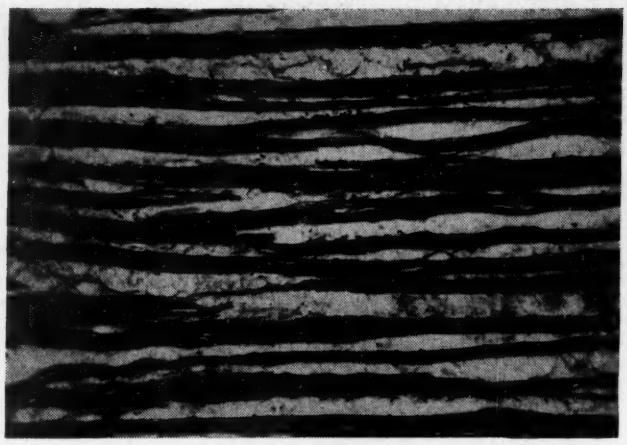


FIG. 2. Longitudinal section of *longissimus dorsi* muscle of beef after freezing at —114 deg. F and staining. X 150.

Temperature of Freezing

There is more to freezing than merely solidifying the meat. The lower the freezing

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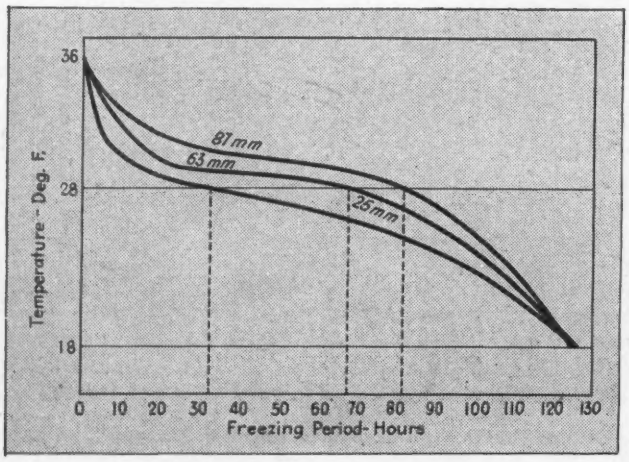
FREEZING has a tenderizing effect on beef. In general the lower the temperature the greater the effect[1]. Beef aged five days at 34 deg. F. and then frozen at + 18 deg. F. was as tender as similar beef aged for 35 days with no subsequent freezing.

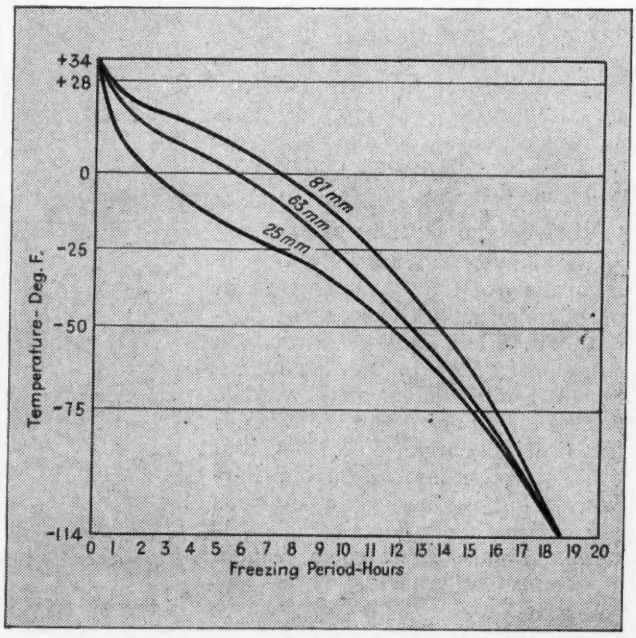
The basic reason for the greater tenderization of beef at the lower temperatures seemed to be a pertinent question. In that connection it had been generally believed that slow freezing tended to break the muscle fibers, whereas rapid freezing left them in their normal condition. With the feeling that this view should not be accepted without further experimentation, the present authors and L. L. Madsen undertook work in which histological studies were made on samples frozen at various temperatures.

Four pairs of short loins from beef and dual-purpose type steers, fed a well balanced ration and slaughtered at approximately 900-lb. weight, were used. The carcasses averaged Good in market grade and, as indicative of carcass composition, the separable fat in the 9-10-11-rib cut was approximately 30.5 percent. Five pairs of samples were cut from each pair of the short loins. Each sample was a cube of muscle tissue approximately 1.5 inches on a side. These samples were cut five days after slaughter and frozen in still air at +18, 0, —10, —40, and —114 deg. F.

FIG. 3. Temperature decreases of beef rounds at 25, 63 and 87 mm. from surface, in +18 deg. F. freezer. (Shown in chart below.)

FIG. 4. Temperature decreases of beef rounds at 25, 63 and 87 mm. from surface, in —114 deg. F. freezer. (Shown in chart at right.)





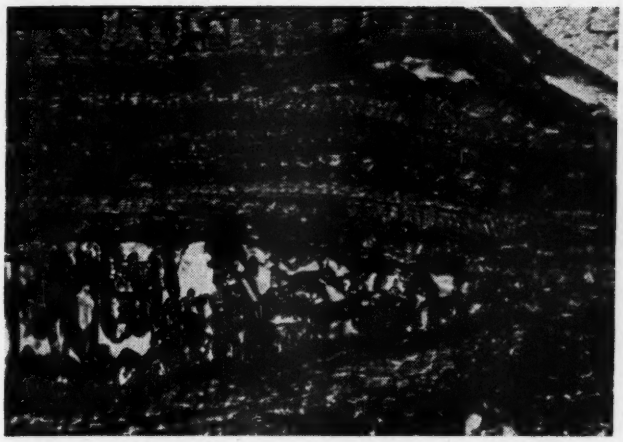


FIG. 5. Longitudinal section of *semimembranosus* muscle of beef frozen at +18 deg. F., 0 to 25 mm. from surface. X 150.

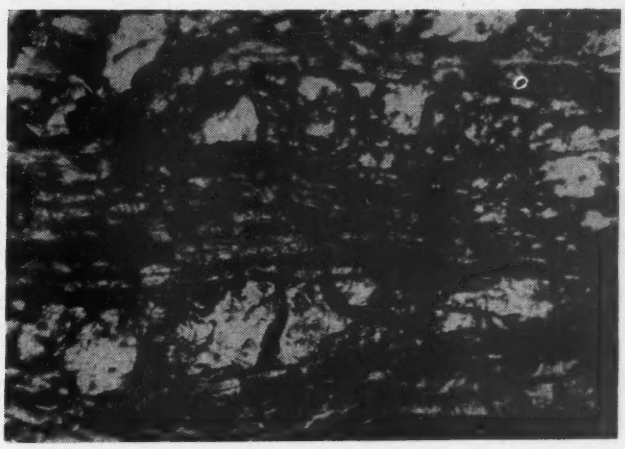


FIG. 6. Longitudinal section of *semimembranosus* muscle of beef frozen at +18 deg. F., 100 to 125 mm. from surface. X 150.

Affects Tenderness of Beef

temperatures, the more tender the beef and the less the drip losses on defrosting

Twenty-four hours after being placed in a freezer, the samples were sectioned, examined under a microscope, and representative longitudinal and cross-section areas photographed. This work was done in a freezer at +18 deg. F. with prechilled microtome, microscopic and photographic equipment. The sections were cut approximately 15 microns in thickness, carefully unrolled on a cold slide, covered with a cover slip, and photographed. Magnifications of 150, 300, and 600 were used. The sections were illuminated by a 200-watt, tungsten filament lamp, using a blue filter of high transmission at 4500 Å.

In order to check these findings and have a permanent record, an adjacent section was cut in each instance, unrolled on a cold slide, thawed by the operator's fingers, and placed in 70 percent alcohol. Sections were stained with haematoxylin and eosin in the usual way.

Freezing other similar samples at 0 deg. F. after five days resulted in more tenderization than that of the aged check samples. After 10, 15, 25, and 35 days' aging, freezing had a tenderizing effect at both freezing temperatures but the effect from freezing decreased as the period of aging increased.[2]

At this point it is well to consider the structure of a normal fiber from the voluntary muscles. Individually the fibers are somewhat round or oval in cross section, but vary in diameter and length. A number of these fibers make up a bundle and in turn a number of bundles make up a muscle. A muscle consists of about 60 to 75 percent water, depending on its fatness, and a large proportion of this water is within the fiber. When the water freezes it tends to crystallize as pure water.

In the present study, when freezing was done slowly, as at +18 deg. F., apparently the water was withdrawn from the fibers and frozen between them, creating large ice areas that left the fibers bunched in irregular shapes. (Fig. 1) No intrafiber ice crystals were visible.

When the temperature of freezing was lowered to 0 deg. F., there apparently was not time for all of the water to be withdrawn from the fibers. A few intrafiber ice crystals were visible. Moreover, the ice

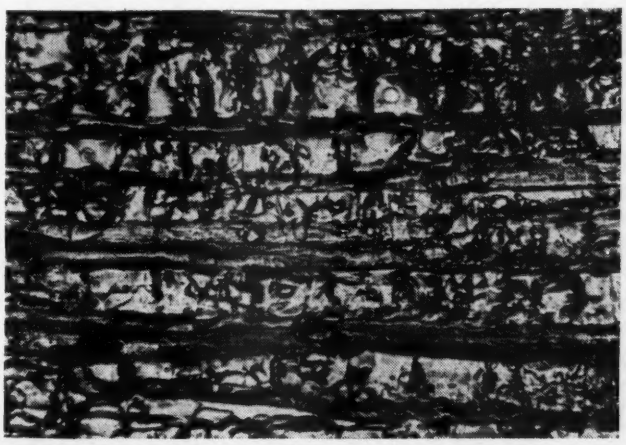


FIG. 7. Longitudinal section of *semimembranosus* muscle of beef frozen at —114 deg. F., 0 to 25 mm. from surface. X 150.

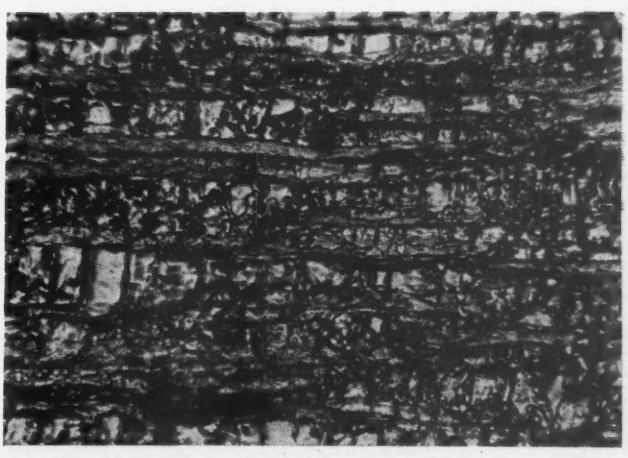


FIG. 8. Longitudinal section of *semimembranosus* muscle of beef frozen at —114 deg. F., 100 to 125 mm. from surface. X 150.

areas and crystals were smaller. When a temperature of —10 deg. F. was used for freezing the beef, more intrafiber ice crystals were seen and there was some fiber splitting. The crystals were smaller than those observed at 0 deg. F. There was further decrease in crystal size and increase in fiber splitting at —40 deg. F.

When the temperature —114 deg. F. was used, the freezing appeared to be so rapid that the fibers were split longitudinally. (Fig. 2) The ice crystals were much smaller and much more numerous than those produced at any other of the temperatures studied and occurred almost entirely within the fibers.

Examination of the stained sections confirmed these observations and, furthermore, showed that as rate of freezing was increased precipitated proteins and nuclear fragments were more and more in evidence. Sections indicated that fiber splitting occurred at 0 deg. F.

A further objective of this study was to determine the relation between the histological (microscopic) characteristics of the muscle tissue frozen at the different temperatures on one hand and tenderness and drip losses on the other hand. Four additional pairs of short loins were removed from beef carcasses. At the end of 5 days' aging at 34 deg. F., each pair of short loins was cut into six pairs of samples, 1.5 inches thick. Representative samples were heated to an internal temperature of 138 deg. F. in an electric oven at 392 deg. F., then tested for tenderness by a mechanical device.[3] At the time the check samples were tested the remaining samples were divided into equal groups according to a statistical plan and frozen at +18, 0, —10, —40 and —114 deg. F. The samples remained in the freezer overnight and were removed, weighed and thawed for 24 hours at 45 deg. F. Drip losses were obtained on each of the samples. After weighing, samples were tested for tenderness in the same manner as the unfrozen check samples.

The meat frozen at +18 deg. F. had distinctly the greatest weight loss during freezing and that frozen at —40 deg. F. the least, with the remaining temperatures producing intermediate results. Weight loss during thawing was nearly the same for all temperatures. However, the drip loss for those samples frozen at +18 deg. F. was distinctly the greatest and for those frozen at —114 deg. F. the least.

The samples frozen at +18 deg. F. were 9.2 percent more tender than those not frozen. However, the beef frozen at —114 deg. F. was 28.6 percent more tender than the unfrozen check samples. At the temperatures between +18 and —114 deg. F. the tenderness also was intermediate, increasing with decreasing temperature.

One may conclude that when freezing was done at +18 deg. F. the moisture largely froze outside the fibers and upon thawing was not reabsorbed but a relatively large proportion dripped from the meat. On the other hand, as freezing produced more fiber splitting, a larger proportion of the water that had been frozen was reabsorbed by the intracellular substance. The increase in tenderness was probably due to the increased fiber rupture by intrafiber ice formation and the stretching and rupturing of the interstitial connective tissue.

Studies on Large Samples

The studies described above were made on relatively thin samples of meat that were frozen and examined within 24 to 36 hours. The results led to the question as to what happens when large samples are frozen. For work on this problem beef rounds, with shank and rump off, ranging in weight from 40 to 45 lb. were used. These rounds were from steers similar to those mentioned above. Five to seven days after slaughter, the rounds were removed, weighed, placed in the freezer, and allowed to remain until their internal temperature was that of the surrounding still air. A series of three thermometers was used to determine the freezing rates in each round. These thermometers were placed as follows: The bulb of the first as near the center of the round as possible, or approximately 87 mm. from the cut surface; that of the second to a depth of 63 mm.; and the bulb of the third to a depth of only 25 mm. These thermometers were read each half hour or hour during the day. Temperatures of freezing were +18, 0, —15, —40, and —114 deg. F., in still air.

The results of the study indicate that it required approximately 126 hours to freeze a beef round to the center at +18 deg. F. in still air, 48 hours at 0 deg. F. and less than 19 hours at —114 deg. F. The curves for round at +18 deg. F. (Fig. 3) indicate that the outside 25 mm. decreased in temperature most rapidly down to the point at which crystallization began (28 deg. F.). Thereafter, however, the rate of reduction in temperature at the 25-mm. level was materially reduced. The result was that 98 hours were required for the temperature at this level to be lowered 10 degrees from 28 deg. to 18 deg. F. On the other hand, the center of the round required a relatively long time to reach 28 deg. but thereafter the rate of reduction in temperature was the most rapid of the three levels. In that instance, only about 59 hours were required for the temperature to be changed from 28 deg. to 18 deg. F. At the intermediate level of 63 mm. there was an intermediate rate of reduction in temperature from 28 deg. to 18 deg. The final temperature of 18 deg. F. was reached at all three levels in the round at about the same time. That is, there was little if any difference in total time required. This probably was due to the fact that the outside portion froze first but a frozen material, being a good conductor of heat, was kept at a relatively high temperature by the transfer of heat from the deeper portion of the round.

As shown by Fig. 4, when the rounds were frozen at —114 deg. F., the crystallization level was reached in the outer portion, 25 mm. from the surface, in approximately 15 minutes. At the center of the round the same temperature was attained in about 30 minutes. In fact, the reduction in temperature continued to be most rapid in the outer portion and least rapid in the center region until a temperature of about 0 deg. F. was reached. Beyond that point it is apparent that the situation was reversed, with the reduction in temperature of the outer portion least rapid and of the center region most rapid. In this respect results correspond in general to those obtained at + 18 deg. F.

In preparation for a study of histological characteristics as related to rate of freezing, a rectangular block of muscle tissue, 100 mm. x 100 mm. x 150 mm., was cut from each round. This block consisted largely of the *semimembranosus* muscle. It was immediately taken into a +18 deg. F. freezer and from it were cut six 25-mm. cubes representing increasing distances, from 0 to 150 mm. from the original cut surface or face of the round. From each cube, sections 15 microns in thickness were cut, unrolled on cold slides, covered by slips, examined under a microscope, and representative fields photographed. Both longitudinal and cross sections were examined. Magnifications of 150 and 600 were used in longitudinal sections and only the

former in case of cross sections.

Fig. 5 shows that at 25 mm. from the surface, when frozen at +18 deg. F., the fibers were in large, irregular, distorted groups with large ice formations between the groups. Study of the photomicrographs representing increasing distance from the surface showed decreasing size of fiber groups and of ice formations. At the 125-mm. level, as shown by Fig. 6, the situation differed clearly from that at 25 mm., but no fiber rupture or intrafiber ice formations were observed. This decrease in size of ice formations substantiates the earlier finding: that from the temperature at which crystallization began the freezing at the center of the round was more rapid than in the outer portion of the meat.

Photomicrographs of the samples frozen at 0 deg. F. showed again relatively large ice areas near the surface and smaller formation toward the center. However, at succeeding 25-mm. intervals these ice areas were smaller than those from rounds frozen at +18 deg. F. Some intrafiber ice crystals were observed, but no fiber damage. The same picture was found for rounds frozen at —15 and —40 deg. with fiber rupture and smaller, more numerous, ice formations.

At —114 deg. F. the surface tissue showed small intrafiber crystals and fiber splitting. At the distance of 25 mm. from the surface, as shown by Fig. 7, the ice formations were moderately large. They decreased again at succeeding 25-mm. intervals, providing evidence to support the previously discussed results on rate of freezing. Fig. 8 shows the condition of the tissue at the 125-mm. level, when frozen at —114 deg. F.

To provide a basis for comparing histological observations with tenderness, 21 pairs of rounds from Good grade carcasses were used. Seven days after slaughter the rounds were removed and one round of each pair was cut into four samples. Sample No. 1 consisted of meat from the surface to a level 37 mm. from the surface. Sample No. 2 included meat from 37 to 74 mm. deep in the round; No. 3 from 74 to 111 mm., No. 4 from 111 to 148 mm. These four samples were heated to an internal temperature of 138 deg. F. in an electric oven at 392 deg. F. From each heated sample, eight standard-size plugs were removed and were tested with the previously mentioned tenderness testing machine. Four of these eight plugs were removed from the *semimembranosus* muscle, two from the *semitendinosus* muscle, and two from the *biceps femoris* muscle.

TABLE I—Average Tenderness (Resistance to Shearing) of Beef as Affected by Temperature of Freezing and Distance From Cut Surface.

Temperature of freezing and sample numbers	Number of pairs of rounds	Resistance to Shearing Unfrozen samples, pounds	Resistance to Shearing Frozen samples, pounds	Decrease in resistance to shearing, percent
18° F.	7			
Sample No. 1		19.10	15.91	16.55
Sample No. 2		19.55	16.86	13.54
Sample No. 3		19.55	16.60	14.94
Sample No. 4		19.73	17.05	13.56
0° F.	7			
Sample No. 1		18.84	15.66	16.89
Sample No. 2		18.46	15.76	14.39
Sample No. 3		18.48	15.21	17.65
Sample No. 4		17.81	14.48	18.63
—114° F.	7			
Sample No. 1		18.63	14.44	22.14
Sample No. 2		17.66	14.05	19.81
Sample No. 3		18.19	13.77	23.92
Sample No. 4		18.35	13.42	26.78

The other round of the pair was frozen at an assigned temperature. In all, seven pairs of rounds were treated in this manner for each of the three temperatures studied, +18, 0, and –114 deg. F.

As soon as the full round was frozen, it was removed from the freezer, and four samples cut, as in the case of the unfrozen check sample. These frozen samples were thawed at 45 deg. F. overnight and tested for tenderness by the same procedure as the check pair mates.

As shown in Table 1 the rounds frozen at +18 deg. F. produced more tender meat than the unfrozen check samples. With respect to those paired rounds, of which one was frozen at 0 deg. F., the tenderizing effect was even greater. Moreover, those samples frozen at –114 deg. F. were tenderized to the greatest extent. However, no important differences in tenderness were found between samples taken at different distances from the surface of any one round. This was true despite the fact that there were differences, as reported, in the histological picture. Apparently those histological differences, associated with distance from the surface and therefore with rate of freezing, were not of sufficient magnitude to carry with them significant differences in tenderness.

Summary

Histological examination of small cubes of *longissimus dorsi* beef muscle frozen at +18 deg. F. in still air showed large irregular ice areas between bundles of fibers but no intrafiber ice. The fibers in similar samples frozen at –114 deg. F. contained numerous small intrafiber ice crystals and showed extensive fiber splitting. Samples frozen at 0, –10 and –40 deg. F. were intermediate in these respects, with fiber splitting first visible in samples frozen at 0 deg. F. Sections examined after thawing, fixing, and staining confirmed these observations.

Similar samples cut 1.5 inches thick, frozen at +18, 0, –10, –40 and –114 deg. F. and tested after thawing and heating to an internal temperature of 138 deg. F. were progressively more tender. Associated with this was a decrease in drip during thawing at +45 deg. F.

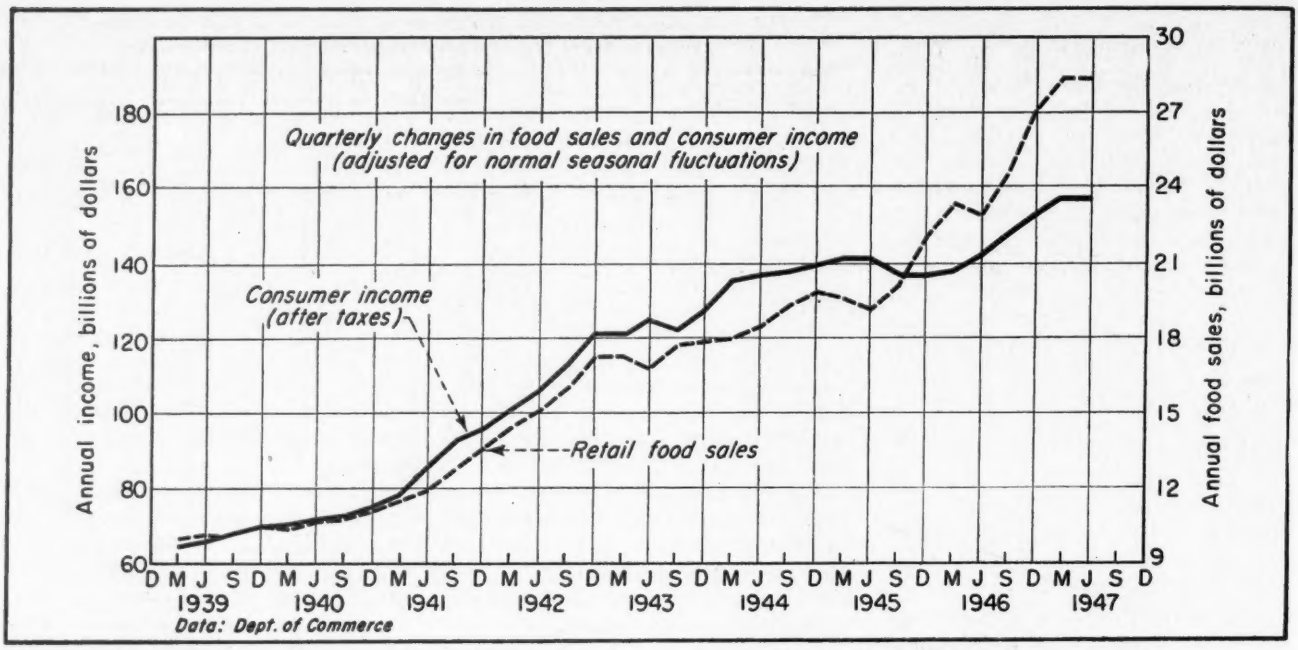
In still air at 18 deg. F., less time was required to lower the temperature from +28 deg. (point of crystallization) to +18 deg. at the center of a beef round than to lower it through the same range 25 mm. from the surface. Final temperature of + 18 deg. was reached in all points of the round in approximately the same time. Similar behavior was noted in rounds frozen at 0, –10, –40, and –114 deg. F.

Tissue within the first 25 mm. from the surface of beef rounds frozen at +18, 0, –10, –40 and –114 deg. F. showed the same general histological picture as that of the small thin samples. However, at succeeding 25 mm. invervals toward the center of the round the ice areas and intrafiber crystals became progressively smaller at all temperatures. The smallest surface crystals were found at –114 deg.

Beef rounds frozen at +18, 0, and –114 deg. F. were more tender than their unfrozen pair mates. The least tenderizing effect was at +18 deg., the greatest at –114 deg. F. At none of the temperatures studied were any important differences in tenderness found between samples taken at different distances from the surface. This was true despite the differences in histological structure.

References

1. The results were published in abstract form in the 1938 *Proceedings of the American Society of Animal Production* and were published in full in Food Industries (1940) 12, 49-51.
2. Published in *Refrigerating Engineering* (1941) 42: 172-174, 198.
3. This apparatus was devised and standardized by K. F. Warner and L. J. Bratzler. See U. S. D. A. Research Achievement Sheet 39 (A) and "Quality in Meat and Meat Products." *Ind. and Eng. Chem.* (1945) 37, 220-223.



DISPROPORTIONATE share of consumer income is being spent on food, according to this quarterly comparison chart.

Decline in Food Spending?

Present indications are that swollen retail expenditures on food will be diverted in part into rents, automobiles, and similar channels. Food spending will suffer with any business recession or reduction of incomes

By SANFORD PARKER
McGraw-Hill Department of Economics

ALMOST everyone in the industry very well knows that foods have been taking an abnormal share of the consumer dollar in recent months. And as many food men fear that share will shrink over coming months. That's why so much uncertainty and concern have plagued food processors in many lines of late.

Such scares are in good part well grounded. But a careful study of the outlook can dispel many that are illfounded.

In the outlook can now be seen a decline of anything from 5 percent to 20 percent in dollars spent on food. This decline may result from both a recession in general business and a reconversion of distorted consumer spending patterns.

It's plain from the chart above that food spending is out of line with income now. In peacetime years the two curves rose and fell together. In the war, food quite naturally fell behind, what with rationing and price control. With V-J Day expenditures soared.

Food Dollars Excessive

There was no wonder that food dollars became excessive right after the war ended. Foods formerly siphoned to the military and to lend-lease once more became available. And there were little or no hard goods for consumers to buy, so they put unused dollars into foods and other soft goods. And that pattern, which started late in 1945, developed in 1946, and fully flowered early this year as ration and price controls were successively ended.

What does make something of a surprise is that excess food spending went so high and lasted so long. Where do the "excess" dollars come from now? After all, many durable goods are back on the market and all prices have soared.

Solution to the mystery of the extra food dollars can be found in expenditures on automobiles and housing. Comparisons show that just as food spending is high, spending on cars and housing has been running far below what levels you'd expect at today's high incomes, judging from norms developed in the past. For we are still not making anywhere near as many cars as people would like to buy; and rent control permits consumers to pay far less for housing than they would usually have to in times of high incomes and few new homes.

Specifically, here's how the distorted postwar pattern of consumer outlay lines up: The share of incomes spent on food in the first quarter was running around $5,000,000,000 more than normal. But the dollars going to cars and rent were, respectively, about $7,500,000,000 and $4,500,000,000 below

(*Continued on page* 214)

EDITORIALS

LAURENCE V. BURTON, Editor

Should Save Money

WHAT looks like a different move in reducing a part of the cost of distribution of frozen foods is indicated by the construction of a new refrigerated warehouse in Watertown, Mass., a suburb of Boston. The whole theory of this suburban location is that the principal market for frozen products is in the higher income suburbs rather than in congested low income city areas.

Since suburbs are more easily reached from suburbs than through the irregular streets of Boston's commercial center, it appears that distribution costs can be reduced by the lesser truck time involved.

Know: Don't Guess

ALMOST a century ago Oliver Wendell Holmes, Professor of Medicine at Harvard, though much better known as an essayist, visited Pasteur in Paris and reported that the principal idea he learned from the father of modern scientific research was this: One should never guess or conjecture when one can *know*. Louis Pasteur had a passion for facts and never omitted a single detail. He knew. He never guessed or took anything for granted. As a result of his thoroughness, all of his researches have stood up to the tests of a century, and seemingly he learned all there was to know about any problem he ever tackled. No one has ever been able to add anything to his findings.

Despite the venerable age of the principle of knowing instead of guessing, the idea of taking things for granted is all too prevalent in the food processing industry. Right now there are several sizeable lots of a liquid food in the custody of the United States Marshal after libeling by the Food and Drug Administration on the ground that the article of food contains a poisonous and deleterious substance. The libel is based on the presence of a small amount of monochloracetic acid that was added as a preservative.

Without entering the controversy about whether monochloracetic acid is or is not a poisonous substance in the quantities that would be partaken if the food were consumed by a person, it should be pointed out that the manufacturers who used this material as a preservative apparently did so in the belief that it would hydrolyze and leave no detectable trace of its presence. If the end products were only a chloride and acetic acid the belief would probably be justified. Unfortunately for the manufacturers in question, they believed — but did not know. Somehow F&DA discovered a scientific test that revealed the use of the preservative that not only is lacking from the list of permitted preservatives, it was not declared on the label.

Again let it be reiterated that Food Industries is not debating the need for a preservative in this product, nor the merits of the particular preservative used. For we believe that any competent food technologist could build up an impressive case for either side of the incident. The discussion is only to point out the necessity, measurable this time in dollars and cents, for knowing instead of surmising, the facts about something new and untried, especially when it is obvious that government chemists, sooner or later, will scrutinize the product. Like the old principle of safety, it is better to be safe than sorry.

Contra Seasonal Butter Prices

ONE of the strange phenomena of the year was the rise in the price of butter in June. It was strange for two reasons. Ordinarily June is the month of flush production of milk and if ever production of dairy products would be great enough to force prices down, it would be in that month. Furthermore, there has been no lack of rain in the large dairying areas. Pastures have never been more lush. It really looks as if there was a great deal more consumer buying power than some of the pessimists have envisioned.

Hold On to Your Spare Parts

FEARS, that seem to be groundless, about the prospects of a business recession have caused quite a number of food processors to reduce their technical staffs. While such reduction of technical personnel may be necessary in isolated cases, in many others it is nothing more than a precautionary move to lighten the expenses before rather than after something happens. Many such moves will prove to be of very questionable wisdom unless the anticipated bad news develops.

Recent trends show that the prophets of gloom have not been wholly correct. People don't pay the going high prices for meat and butter these days, unless the buying power is there. And as long as the buying power is freely expected, a recession of business is not likely to come about. From many indications the widely advertised and freely predicted recession is not coming off on schedule. While it would be folly to predict it will never come, it is not fallacious to caution management to think twice before depleting their staffs of technical brains.

There are not enough engineers, food technologists and other technical folks to go around. Our national wartime failure to keep the promising young men in colleges and universities has created a shortage that will persist for many years to come. If experienced technical men now on your payroll are allowed to get away, then when you need them at a little later date, you will not be able to replace them except at very high prices.

One medium size food company has told us that in the 'Thirties they made the most foolish economy move they ever made by laying off many of their technical men. At the time it seemed appropriate. But 15 years later they have discovered that it is now necessary to promote many non-technical men into executive jobs where the best technical brains are required. To be sure, they could go outside and hire newcomers at very stiff figures, but the newcomers lack the continuity of company experience desired—nay indispensable—for successful operation of an exceedingly complex business. The company vows that never again will they lay off technical staffs—that if a pinch ever comes again, it will be better to borrow money than lose their prime asset—men of sound training and long experience.

This incident should be carefully considered by management before any hasty decisions are reached. The problem of where the company will find suitable executives in 10-20 years hence should be carefully studied before reducing staffs. A few thousand dollars saved now on current expenses may be the cause of a great many thousand dollars wasted at a later date. Men of technical education are the most important spare parts of a company's future organization. They should be retained unless there is no other way to remain solvent. Once gone they will be extremely difficult to replace.

How Is Your Repair Shop?

FOR some time we have meant to get around to War Assets Administration and its sale of surplus tools, especially machine tools. Every food plant should have its own repair shop, the size and variety of tools depending on common sense needs. The opportunity exists for every plant to equip its own shop at low cost.

How much of a shop is required depends to a considerable extent on what nearby facilities exist. Obviously, a plant located across the alley from a first-class jobbing machine shop needs fewer machine tools of its own than one located miles away from such a shop.

While good machine work requires skilled machinists, it is surprising what repairs can be made by ordinary workers. Plants that are located in country towns usually employ many ex-farmers—the most resourceful workers that exist. If this department were operating a country plant we should never hesitate about putting in a good shop just because there might be no journeyman machinists available. An unskilled worker may spoil some work, and may take a lot more time than a skilled journeyman machinist, but he will often get the job done surprisingly well. He may be able to keep the place going when otherwise there might be long delays from break downs.

If any assortment of metal working tools is available we would recommend that every plant that lacks the following motorized tools should buy them and install a good shop. It's a good idea, however, to let a good machinst make the selection. Some rather trim looking machines can be nearly worthless from excessive wear.

Grinders
Drill press *and drills* of sizes 1/16 to 1" or larger
Lathe (Preferably a screw cutting lathe with a bed long enough to take any work that might arise from present or foreseeable equipment repairs. And plenty of tools.)
Shaper
Bench milling machine
Power hack saw
Forge—Anvil— Blacksmith tools
Acetylene or electric welder
Hand tools, galore
One assumes the plant has a pipe shop.

Big plants already have their own shops, but small plants too often lack satisfactory repair equipment. This is a time which we fervently hope will never come again, when every plant can be prepared for emergency repairs at small outlay.

Denmark Doesn't Have All the Virtues

DENMARK has been cited as one of the best examples of a well-balanced, prosperous, permanent agricultural country because of its livestock industry that produces dairy products especially. This citation has been used to substantiate the claim that diminished butter sales in the United States will lead to increased margarine sales, and thereby indirectly lead to a big increase in cotton and other crops that are rich in oils. And, all of this is said to point to a ruinous loss of soil fertility and further losses by erosion if U. S. cotton states should produce these oil crops.

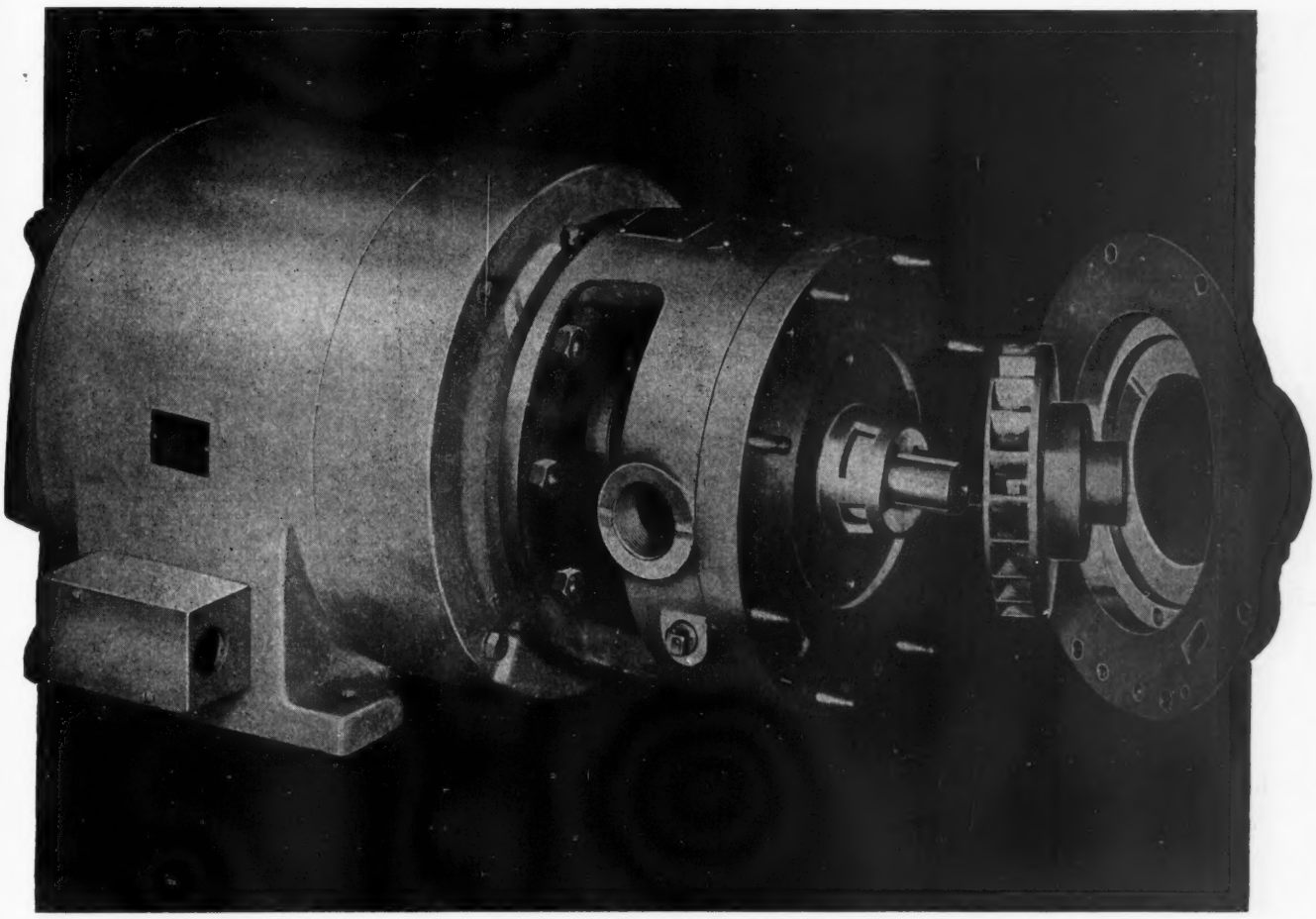
Just to keep the record clear, let it be noted that Denmark's remarkable prewar dairy farming has been, to a notable extent, based on imported oil meal and oil cake, of which cotton seed cake accounts for one-half. The Bureau of Foreign and Domestic Commerce reports that in the year 1937 we exported to Denmark 15,798 tons of cotton seed cake, and in 1938, 22,563 tons. Our exports to that country fell off to 720 tons in 1939 and none thereafter during the war years.

Danish imports of oil cake and oil meal from all sources and of all kinds in 1937 were roughly 587,000 tons, in 1938, 696,000 tons, in 1939, 633,000 tons. In 1940 they dropped to 186,000, in 1941, to less than 1,000 tons and in 1942, there were no imports of oil cake or oil meal into Denmark. The U. S. share of oilseed byproducts imported by Denmark in prewar years was about three percent of the total.

During the war lack of such oil cake and oil meal imports forced the Danish farmer to modify his whole dairy program. Milk production was curtailed markedly.

We do not debate the effect of cultivating crops as factors in soil erosion. But we don't think that Denmark should be credited with all of the agricultural virtues, in view of its large prewar imports of oil cake to sustain its dairy production.

The Nash Clean-Air Compressor has but one simple moving part.



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

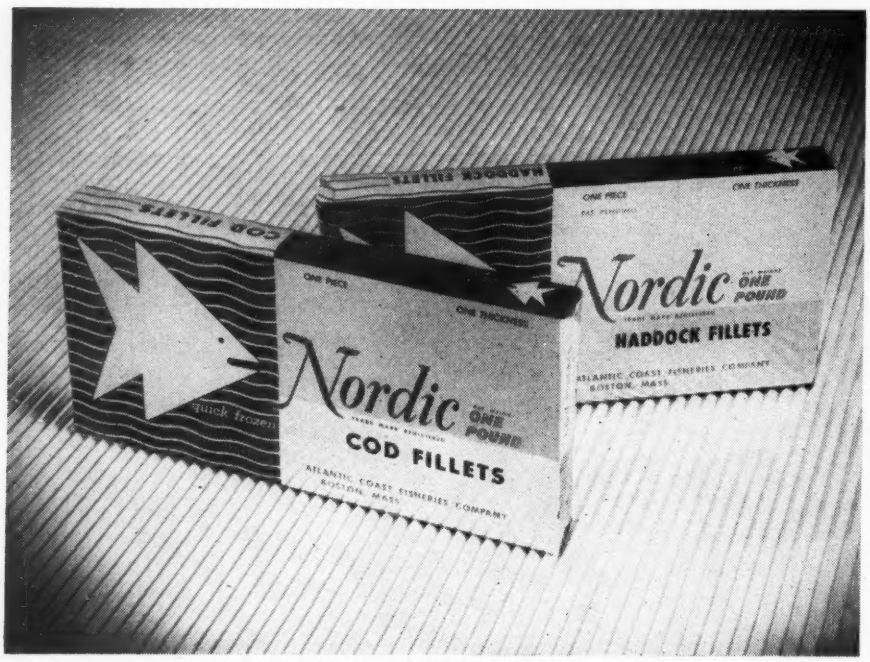
Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS



Something Really New In Fish Fillets

NINE years of research by Atlantic Coast Fisheries Co., Boston, have led to the development of a method for forming fish fillets into solid pieces of flesh three quarters of an inch thick, 8 inches long and 4 inches wide. The resulting "brick" can be sliced into any size portion.

The cod and haddock fillets, after forming, are placed in coverless cartons or boats of the same size as the product itself. These cartons are manufactured by Container Corporation of America.

Laminated aluminum foil, manufactured by Reynolds Metals Co., under the trade name Reyseal, is .0004 gauge aluminum solid glue mounted to 28 lb. paper on which is waxed-mounted an 8 lb. tissue paper. Heat sealing this package is accomplished by the wax.

The master carton holds 10 lb.—two 5-lb. layers. Two 10-lb. cartons are fitted into a sleeve for shipping.

The foil wrap carries a most attractive design. The effect is modern and cool. The basic dark blue, silver and white scheme is supplemented by some red printing.

The company recommends that the fillets be cooked while frozen. The back panel of the package suggests ways to prepare.

The first pack consists of cod and haddock, although Atlantic Coast expects to pack red fish, ocean pike and other filleted fish in this new form in the future.

Neat Trick

ABBOTTS DAIRIES, INC., Philadelphia, has adopted a convenient new carton for its fancy ice cream roll.

The ice cream is wrapped in a corrugated paper and placed in a cylindrical carton with removable bottom. To extract the roll, it is necessary only to remove the cardboard top and push the bottom out. In this way the ice cream is easily ejected with a minimum of handling and waste.

The carton is done in light blue and red and follows the design of other Abbott labels.

Weight is not less than 27 fl. oz.

Stately Potatoes

STATE OF MAINE again receives publicity through its potatoes. This time the potatoes are dehydrated.

Baxter's Finest, products of H. C. Baxter & Bro., Brunswick, Me., are putting out a diced dehydrated potato product packed in a folding carton done in red, white and blue and labeled State of Maine.

Contents of the box weigh 8 oz. and serve 12 persons.

Other products that have been carrying the Maine theme are whole raw potatoes, canned potatoes, eggs and lobsters.

Ritzy Eggs

COCKTAIL eggs, seasoned by hypodermic injection, are being manufactured by Warner & Son, Lynnwood, Wash. They are now in national distribution after having been introduced on the West Coast a few months ago.

David Warner, head of the food department of Allied Stores' Bon Marché department store in Seattle, processes the eggs at his ranch, using many of his own eggs as well as those from nearby ranches.

Candled twice, the eggs are seasoned with an injection of eight kinds of spices, butter flavoring and salt. Next, they are boiled, the length of boiling time being important to assure the proper coloring of the yolk. Finally, they are shelled and colored.

In bottling, the eggs are placed in a curing solution containing spices, sugar, salt and dressing. This, incidently makes a base for salad dressing. The entire process takes 36 hours. A pint jar holds six eggs and weighs 12 oz.

Frozen Beef

AMONG the first carload shipments of packaged quick frozen beef is a selection of cuts from Fremont Packing Co., Fremont, Neb.

Distributed in New York by West Shore Beef Co., the meat cuts are wrapped in Cellophane or Pliofilm and have label inserts which carry weight and product identification. Brand name is Winterset.

Most of the beef is labeled U. S. Good, the cuts including roasts, chopped beef and steaks.

These frozen meats help to satisfy a demand by frozen food retailers for products which they have not heretofore been able to carry to any great extent.

These Apples Rate

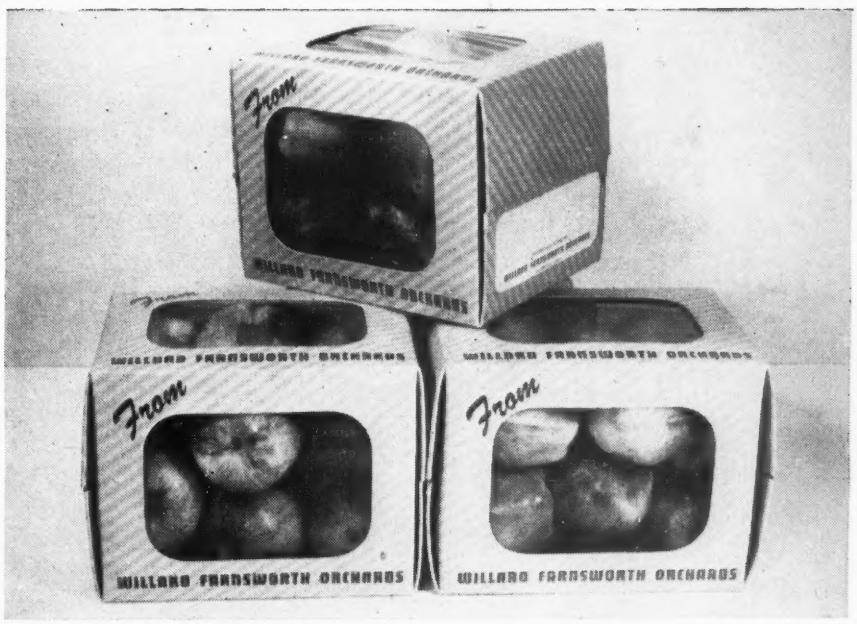
APPLES in jumble pack cartons, manufactured by The Ohio Boxboard Co., Rittman, Ohio, have proved to be quick sellers during tests in Toledo, Ohio, supermarkets. It was found that the attractive green and white container has both serviceability and merchandising appeal.

The Jumble Pack holds four pounds of apples and can be packed by a semi-automatic or hand method and can be closed without gluing or stapling.

It can be shipped flat to the packer, the special bellows closing being easy to set up, fill and close. When the carton is filled, the pressure of the fruit against the inner flaps acts as a lock so that the fruit will not fall out.

Printed in red and green, the back panel of the container shows the use and season of many varieties of apples. Two large Pliofilm windows allow adequate visibility of the product. A white space is provided on the end panel for the packer to mark the weight and variety of pack.

Twelve cartons making a bushel are placed in a master corrugated container for shipping to the retailer.

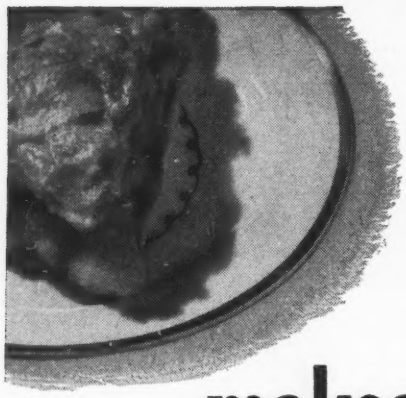


Frank Gets Dress

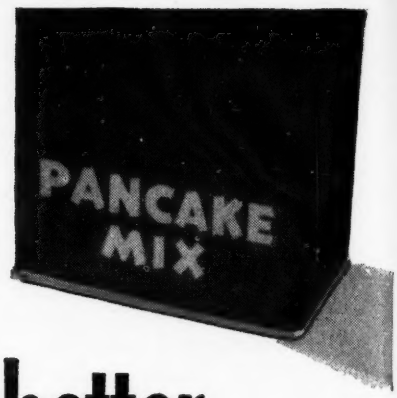
AFTER a long series of preliminary store tests, Swift & Co.'s new 1 lb. consumer package of frankfurts is ready for national distribution.

The tests revealed that dealers found their selling costs reduced since wrapping and weighing expenses are eliminated. The package is appealing to the consumer because she knows she is getting the same meat product each time.

The transparent, heat-sealed Cel-



Soy



makes good products better

Soy flour is a truly astonishing ingredient. This basic food product, when added to other foods, brings them new richness, new color and deliciousness. In mixes, it works wonders with soups and pancake flours. In bakeries and confectionery plants, it extends shelf life and adds deliciousness to products ranging from pie crusts to chocolate creams. You'll find soy improving the color, flavor and tender texture of foods from sausage to sweet doughs.

Over the years, our long experience with soy has helped many manufacturers in improving present products and developing new ones. Our technical staff, well-equipped with the most modern food preparation equipment, will be glad to put its talents at your disposal.

Ask us to show you what Staley's soy flours can do for you.

A.E. Staley Mfg. Co.

America's soy headquarters

DECATUR, ILLINOIS ☆

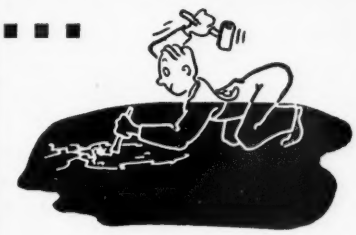
STALEY'S HI-FAT SOY FLOUR

★

STALEY'S LO-FAT SOY FLOUR

Canadian Representative:
James L. Doig, 6876 Sherbrooke Street,
West, Montreal 28,
Quebec, Canada

There's no need to rip up your old floor ...



Stonhard Resurfacer makes repairs to wood or concrete floors easy. Your handy man can quickly install **Stonhard Resurfacer** at a thickness of only 1/2" right over the old, worn floor surface.

Floors resurfaced with **Stonhard** are warm, dry and resilient. Under traffic **Stonhard** compacts and improves with each year of service.

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lophane wrapper with the franks arranged in two layers tends to retain the meat's natural juices and flavor, reducing drying.

The Swift trademark symbol and information about product contents are imprinted in red on the wrapper. The package contains nine or ten franks and is well suited for display in self-service refrigerated cases as well as regular butcher shops.

Rice, Ready-to-Eat

CANNED cooked rice, "Ready to eat as soon as you heat," is the product of Malek Food Products Co., Chicago.

In processing, rough rice or paddy is soaked in water, steamed under pressure, dried and milled. The content of water-soluble nutrients in this processed rise is said to be materially higher than in white rice.

Instructions for preparation are to open can at both ends, empty contents into strainer or colander, rinse with cold or hot water, separating kernels, then heat in butter over low flame.

The can label has a number of recipes printed on the back. Net weight is 12 oz.

Sweet

NEWEST member of the Pennant Corn Syrups family, produced by Union Starch & Refining Co., Columbus, Ind., is Pennant Hi-tose Crystal Syrup. The high conversion corn syrup has been developed especially for fruit freezing and canning.

The syrup is said to have outstanding advantages in preserving the sweetness, color, flavor and firmness of fruits being processed.

Beauty
PLUS

ASSURED BY

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FOOD PACKAGINGS

We design and supply complete packagings for all types of foods . . . from meats, to macaroni, to milk chocolate . . . wraps, enclosures and bags . . . glassine, wax glassine and cellophane in rolls and sheets, bags and envelopes of wax glassine and cellophane.

Yes, for Beauty, Utility and Product Protection, consult "experts of long standing." Send us your problem; advice gladly given.

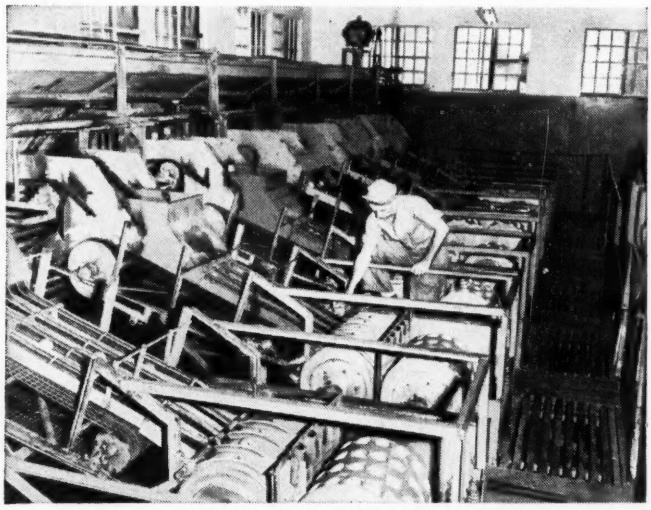
PACKAGING DIVISION
E. W. Twitchell Incorporated
777 Public Ledger Bldg., Philadelphia 5, Pa.

CANNERS LIKE CROWN SERVICE...

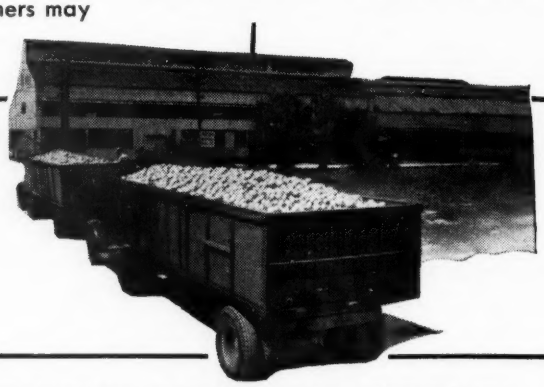
J. WILLIAM HORSEY CORPORATION A LEADER IN CITRUS FRUITS

Mr. J. William Horsey, president of the J. William Horsey Corporation, and head of many enterprises in the United States and Canada, conferring with Robert J. Siebert, Crown Can Representative.

Customers' "Store"... in connection with its down town offices in Tampa, Florida, the J. William Horsey Corporation maintains a "store" where prospective customers may sample the corporation's products.



Juice Squeezers in the Tampa, Florida, plant. Each rotary drum accommodates a different size orange or grapefruit.



Trucks lined up waiting to unload grapefruit at north side of the J. William Horsey Corporation Plant at Tampa, Florida. This is one of five plants operated by the corporation.

ONE OF A SERIES FEATURING CROWN CAN CUSTOMERS

CROWN CAN

THE NATION'S THIRD LARGE SOURCE OF SUPPLY

CROWN CAN COMPANY • PHILADELPHIA • Baltimore • Chicago • St. Louis • Houston • Orlando • FortWayne • Nebraska City

FOOD INDUSTRY NEWS

GENERAL

Agricultural Research Awaits Congressional Appropriations

Among the proposals are processing studies on citrus juices, potato utilization, sanitation and transportation

PROJECT proposals for research to be conducted under the Research and Marketing Act are being studied by the Department of Agriculture preparatory to putting them into effect when Congress votes the necessary funds. The act authorizes annual appropriations ranging up to $20,000,000 in 1951. At the beginning of July, the House had voted $9,000,000 for fiscal '48, and it seemed certain that the Senate would not vote less than that amount.

Besides the heavy emphasis placed in most of the reports thus far submitted on the need for market research and consumer education, many proposals would involve research into processing problems directly or indirectly.

Here are examples taken from the body of the report:

Citrus fruits. The report notes that 37 percent of the total citrus fruit crop in 1945-46 was processed, compared with only 9 per cent in 1935-36. The committee recommends that studies be made in consumer preferences as to bulk or packaged sales. Under the heading of "Improvement of Quality," it suggests research into single-strength juices in containers, concentrated juices and segments. Under "Development of New Products," it suggests research into processing and marketing of pure citrus juices as soft drinks, dehydrated juice powders, juice cells and new blends of citrus juices.

Poultry report. Under the heading of "Processing Technology," the committee pointed out the need for research in freezing or cooling poultry after killing, to reduce loss of both the product and quality of the product. Research is also needed on poultry plant sanitation, the committee states, and in the design and construction of more efficient and sanitary poultry processing machinery. The committee suggests additional research on all phases of breaking and freezing of eggs, and on dehydration of eggs to place them in a competitive position with other egg products.

Potato Report. The report of the Potato Advisory Committee emphasizes the need for solution of the surplus potato problem, which has been dramatized in the newspapers throughout the country. But the committee points to the early need for developing new industrial uses for potatoes through dehydration, and chemical stabilization of potatoes that would permit year-round chemical or dehydration operations. Other experiments suggested: Chemical conversion of potatoes to lactic acid and its derivatives; experiments in production, storing and utilization of potato flour; and design and development of equipment for carrying out continuous acid hydrolysis of potatoes under pressure.

Transportation. Among the general problems of immediate importance requiring research in transportation are the following: Studies of truck operating costs to compare with costs of shipping by other forms of transportation; investigations directed at improved utilization of available railroad equipment, and the need for improved types of refrigerator cars and other equipment for shipment of perishable foods; studies on effect of federal regulation of carriers and their impact on distribution of farm commodities.

Earnings and Dividends

CONSOLIDATED net earnings of $565,019 for the nine months ending March 31, are reported by Airline Foods. Net sales for the period totaled $18,369,458. Inventories were priced at either cost or market, whichever was lower, with write-downs from December 1 amounting to $425,777.

Froedtert Grain & Malting Co., Milwaukee, has declared a dividend of 12½ cents on common stock and 55 cents on the company's cumulative preferred. Both were payable July 31.

Best Foods, Inc. declared a special dividend of $1.00, payable June 24 and a semi-annual dividend of 60 cents, payable July 26.

Press Association

RAIN IN DAYTIME—PLOWS AT NIGHT

With the heavy rains, midwest farmers found too many days in which they were unable to get into the fields for spring plowing. Lights helped this Illinois farmer to take advantage of a few of the clear nights that used to be resting time.

"We built it as an advertising stunt—then found it actually worked!"

QMC Food Plant Units Prepare for Emergency

THE QUARTERMASTER CORPS at the end of June had already set up 48 of the Bakery, Refrigeration, Depot Supply, and Railhead Reserve Units called for in its part of the training program launched by the War Department at the beginning of June.

The Quartermaster Corps goal includes 112 reserve corps units to be set up in bakery, refrigerating and warehousing establishments. Each unit, sponsored by a private firm or civic group, consists of a skeleton or complete service unit (such as a bakery company) made up of the required number of reserve officers and enlisted men. These "affiliated units of the Army Reserve Corps" will be composed of army reservists who saw actual service in such outfits during the war, or who have since had specialized training in this field.

A sponsor, such as a baking company, has no legal obligation by signing up under this program. He may be asked to provide storage space for Army-furnished equipment necessary for the unit's training, and perhaps drill or classroom space for after-hours training sessions.

Object of the program is swifter M-Day conversion of reservists to active duty, abreast of both the military requirements of their specialty and the latest civilian know-how.

Pickle Packers Seek To Improve Quality

HOW to improve the quality of pickles and their market position was emphasized at the Mid-Year meeting of the National Pickle Packers Association, in Chicago.

President Lewis A. Hirsch, Hirsch Bros. Co., Louisville, Ky. pointed out the need for more selective buying of green stock. He illustrated his position by citing the quality of the over-supply of large size, "broken and hollows" and unclassified purchased last year to give a gross supply of more than 10,000,000 bu. From 2,500,000 to 3,000,000 bu. of that supply were still on hand as June 1 carryover. That unusually high carryover plus a 1947 planted acreage of more than 150,000 acres gives the industry a potential 1947 gross supply of about 13,500,000 bu. Consumption during the past 12 mo. has been about 7,500,000 bu. with the prospect that the rate of consumption may continue.

Electronic sorting of salt stock was described as a mechanical means by which the quality of the finished pickles might be improved and the processing costs lowered. Those in attendance approved the recommendation of the Research Committee that the Association sponsor experimental development of an electronic sorter under study by the Buehler Company, Chicago, Ill. The proposed sorter grades the salt stock mechanically according to length and diameter. A saving of 50 percent of manual sorting costs is expected.

Nelson Morgan, Western Food Products Co., Hutchinson, Kan., described a method of syphoning salt stock from tank cars developed by his company to shorten time of unloading tank cars and reducing handling damage to salt stock. The principle of simple syphoning is used. Its success depends upon having the brine in which the stock is flumed of slightly greater density than that in which the green stock was brined.

Packinghouse Workers Ask Agriculture Funds

UNITED PACKINGHOUSE WORKERS, CIO, got in the fight to increase Department of Agriculture appropriations over the level voted by the House of Representatives. In a letter to President Truman, Secretary Anderson, and all Senators, Ralph Helstein, president of the union, urged continued support of many Department of Agriculture programs.

Among those specifically mentioned in Helstein's letter were soil conservation payments, school lunch program, REA funds, loans to tenant farmers for the purpose of purchasing farms.

"We feel that the price support program as provided in the Steagall Amendment should be extended from its present two-year limitation to a minimum of five years," the union head stated.

GMA Hears Results Of Consumer Survey

CONSUMER purchases of food products are as strong as ever in the opinion of Samuel G. Barton, and Kurt Rogers, both of Industrial Surveys, Inc., who made a joint presentation before the annual mid-year meeting of the Grocery Manufacturers of America, at Skytop

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to meet the needs of your Organization

WE are eager to have your firm as one of our many clients and will be glad to advise you (without obligation on your part) as to how we can assist you in many matters requiring the work of an independent laboratory of established reputation and broad experience.

Food Analyses

VITAMIN DETERMINATION
Biological
Microbiological
Chemical

NUTRITIONAL STUDIES—RESEARCH

PRODUCT DEVELOPMENT

BACTERIOLOGICAL STUDIES

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IN-PLANT BREAKPOINT CHLORINATION protects your pack from the bacterial attack of untreated wash water. In addition BREAK-POINT CHLORINATION has been proven to control slime, reduce clean-up time and lower bacterial counts throughout the plant. Write for details that you can't afford to be without to Industrial DIVISION DEPT. F-2

I-7

WALLACE & TIERNAN COMPANY, INC.

MANUFACTURERS OF CHLORINE AND AMMONIA CONTROL APPARATUS
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

Lodge, Pa. There is, however, evidence of a high degree of consumer selectivity, he added, and some products are showing losses as a result.

Comparing purchases in April, 1947, with those of the same month a year ago, Mr. Rogers revealed that consumer purchasers of canned fruit and vegetable juices, this April, were 21 percent ahead of last year. Baby food purchases were up 42 percent; peanut butter, 4 percent; canned fruit 15 percent; butter, 21 percent; margarine, 32 percent; canned soups, 10 percent and canned meats, 16 percent.

Candy Makers Discuss Employee Relations

RECORD-BREAKING registration for the 64th convention of the National Confectioners Association and number of exhibitors for the 21st Confectionery Industries Exposition held in Chicago give measurable evidence of interest in current and future developments affecting the candy industry.

The convention program stressed employer-employee relations, production methods, research progress, outlook for ingredients and supplies, sales and distribution conditions and trade practices. The 95 industrial exhibitors demonstrated newest developments in equipment design and construction for ease of disassembly and cleaning, for low cost of operation per unit of production and for meeting production needs of various sized confectionery making plants.

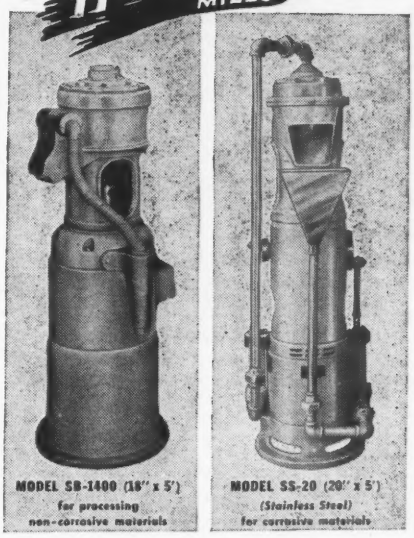
In his plea for preventive labor relations, Robert N. McMurray, a Chicago labor consultant, cited three factors in attaining the desired objective of good employer-employee relations: (1) Make right

Press Association

SMALL FARM TRACTOR
Production on this 1,200 lb. tractor has started at International Harvester's plant. It will cost $545 without attachments and implements. The full cost with all implements will be under $1,000.

SAVE up to 50% on MILL COSTS with

MOREHOUSE HY-R-SPEED MILLS



Multiply production—Improve quality—Save space

Now you can have processing equipment that is amazingly compact, versatile and efficient at half the cost of old style mills. Occupying only a fraction of the space required by ordinary units, these new Morehouse models produce several times as much —better and more efficiently. They are designed for use on a wide range of materials, both wet and dry. Adjustment is quick and easy, either for individual materials or methods of processing including

GRINDING, DISINTEGRATING, DISPERSING, MIXING, HOMOGENIZING, EMULSIFYING

The Morehouse high speed principle makes these revolutionary mills possible. Advanced engineering design and nearly half a century of experience in manufacturing quality products contribute to smooth, economical, dependable operation. Save money, save valuable space and improve both volume and quality with Morehouse HY-R-SPEED MILLS. Write for complete details.

FRUITS • VEGETABLES • MEATS
CEREALS • DRESSINGS
PEANUT BUTTER
GENERAL FOOD PRODUCTS

MOREHOUSE INDUSTRIES
1156 San Fernando Rd., Los Angeles 31, Calif.
Since 1898

initial selection and placement, (2) use intelligent handling of employees after they are hired and (3) practice effective collective bargaining with organized employees.

John F. Hennessey, E. J. Brach & Sons, Chicago, emphasized the value of training programs and outlined his company's method of on-the-job training, apprentice training and supervisory training at three different levels of trainee's need and experience.

George H. Williamson, Williamson Candy Co., asked that industrial relations and personnel work be personalized on the basis of observance of the golden rule. He said the program should be put in the hands of an individual who knows human nature and truly likes people.

At the production forum session, William Bohlke, Radio Corporation of America, Camden, N. J., described the supersonic method of automatic inspection for the presence of any kind of metal particle, even though it may be very small or deeply imbedded in an opaque mass. Individual small units such as candy bars or a whole package may be inspected on an endless conveyor belt or in a chute moving as a speed up to 600 ft. per minute. Lumps of carbon or carbonized material also are detected.

Stroud Jordan, American Sugar Refining Co., New York, cited use advantages of liquid sugar to be lowered cost per sugar unit, economical handling and storage, and improved sanitation and simplification of production. Among its use limitations he cited necessity of removing excess water during cooking, inversion and color formation resulting from longer cooking time, increased transportation costs and limited storage capacity of industrial users.

Benjamin A. Oxnard, Great Western Sugar Co., Denver, discussed advantages of bulk handling of sugar in terms of labor saving, rail freight charges on dry sugar only, choices of four available types of sugar, control over water content of cook, control over dry sugar content and ready availability of needed supply when delivered in insulated and stainless steel lined cars of 100,000 lb. capacity.

Aladar Fonyo, W. J. Stange Co., Chicago, reviewed the significance of flavor changes in fat-or oil-containing products in terms of exposure to atmospheric oxygen and to light, of presence of trace metals and of enzymic activity and the prevention or inhibition of these changes by presence of natural antioxidants or by use of added antioxidants, such as nordihydroguaiaretic acid.

In the session devoted to sanitation, M. R. Stephens, Federal Food and Drug Administration, Chicago, summarized the federal food laws and pointed out their application in protecting the long-term best interests of the confectionery industry.

Thomas Rector, General Foods Corp., New York, evaluated the profit possibilities of research in terms of (1) establishment of new facts, (2) development of new products, (3) improvement of old products, (4) development of better methods of product protection, (5) improvement of manufacturing processes, (6) improvement of manufacturing equipment, (7) development of new raw material sources, and (8) deriving increased value from byproducts.

George F. Dudik, U. S. Department of Commerce, Washington, reported that the candy business reached an all-time high in 1946 in spite of ingredient and supplies shortages and pricing troubles—$687,000,000 at wholesale valuation, 10 percent more than in 1945 and $29,000,000 more than 1944.

Philip P. Gott was re-elected president, W. Melville Cribbs of Melville Confections, Inc., Chicago, and Arthur L. Stang of Shotwell Mfg. Co., Chicago, were re-elected vice-president and secretary-treasurer, respectively. Irvin C. Shaffer, Maillard Corp., New York, is the newly elected vice-president.

Peanut Council Offers Industry Merit Award

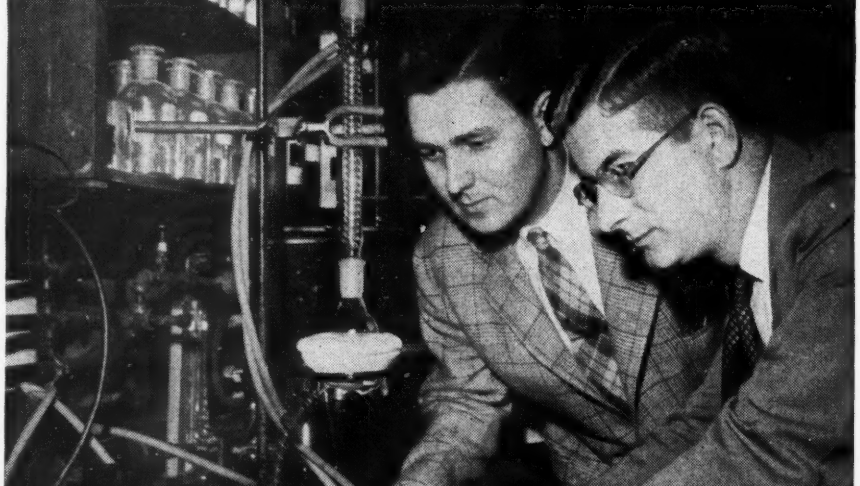
THE NATIONAL PEANUT COUNCIL will present an annual award of $1,000 and a gold medal to the individual or individuals making an outstanding contribution to the peanut industry. The move is designed to broaden the peanut market.

Manuscripts to be judged for the award must be submitted, not later than January 1 of the year, in which the award is to be made, to the Council headquarters in Atlanta, Ga.

The following have been named as judges: Jack W. Nurney of the National Bank of Suffolk. Va.; Dr. E. V. McCullum, of Johns Hopkins University; Dr. D. Breese Jones of the Department of Agriculture; Dr. J. L. Shepherd, of the Georgia Coastal Plain Experiment Station, and Dr. J. F. Reed, of the North Carolina Experiment Station.

Tax Holiday

A NEW inducement to attract industry to Puerto Rico is provided by recent legislation in the island, which gives a blanket exemption from income, property, and municipal taxes as well as excise levies on machinery and raw materials. The most extraordinary feature of this legislation is the fact that no income tax (neither Federal nor Insular) will have to be paid by industrial enterprises established on the island after July 1, 1947.



Wide World

LABORATORY STEAKS MAYBE

Synthetic protein-like substances, which structurally approximate the molecules of meat have been produced by Drs. Robert B. Woodward and Charles H. Schramm, at Harvard.

PROCESSING

New Bill Won't Force Use of Iodized Salt

POSSIBLE passage of a bill requiring all salt sold in interstate commerce to be iodized will not affect the use of salt in processing of foods.

Representatives of the canning industry, appearing at hearings held on H.R. 2717, received assurances from committee members that the definition of table salt, written into the bill, would not include salt used for food processing.

Both the Food & Drug Administration and Congresswoman Frances P. Bolton (R., Ohio) agreed with National Canners Association representatives that use of iodized salt should not be forced on food processors, since there is so little knowledge as to the possible effect of iodine or its stabilizers on the quality of canned food or its shelf life.

Passage of the bill was opposed by the Salt Producers Association. It would require that all table salt sold in interstate commerce contain "suitable iodides in a quantity equivalent to not less than 80 parts and not more than 160 parts of iodine per million parts of salt."

New Grade Standards Proposed for Beans

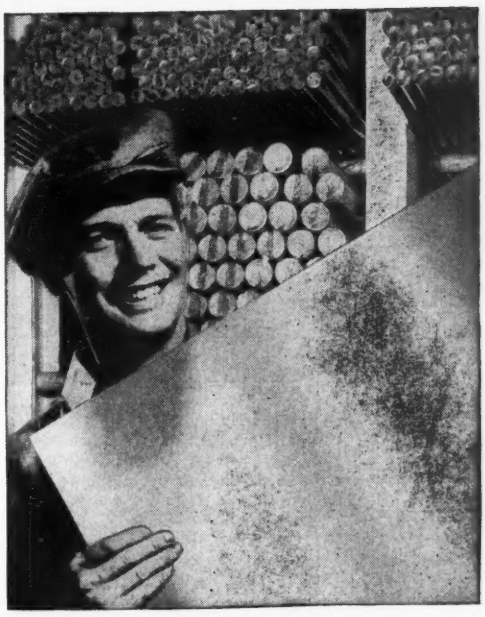
PROPOSED revision of the existing grade standards for canned green beans and canned wax beans was published in the Federal Register for June 25 on pages 4117 to 4121. These proposals were presented by the Production and Marketing Administration. Standards of identity as defined by the Food and Drug action of last February.

As before, styles, grades, fill of container, drained weight, and types of canned beans are discussed in detail. Styles may be whole, whole vertical pack, whole asparagus style, sliced lengthwise (or French style), cut, or short cut. Grades are five in number, designated "U. S. Grade A" to "U. S. Grade D" and "below standard in quality; good food—not high grade."

Recommended fill of container is that "the product and packing medium occupy not less than 90 percent of the total capacity of the container." Recommended drained weights are given in tabular form for various container sizes and styles of canner beans.

Two types of canned beans are

ALLEGHENY
Stainless in Stock



Prompt Shipment . . .

Eleven Ryerson plants provide convenient stocks of Allegheny Stainless—bars, plates, sheets, strip, seamless and welded tubing and pipe, pipe fittings, welding flanges, welding rod, etc. Stocks are unbalanced from a size standpoint because of the great demand and deliveries not as fast as usual, but you can count on prompt shipment of most requirements. The uniform, high quality of Allegheny Stainless plus the expert counsel of Ryerson metallurgists make this the practical source for stainless from stock. Call, wire or write—

JOSEPH T. RYERSON & SON, INC., Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston, Los Angeles.

OTHER PRODUCTS:

Bars	Alloys
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RYERSON STEEL

FLEXIBLE STEEL CONVEYOR BELTING

Regardless of whether your process is Canning, Freezing, Dehydrating, or Pickling or you pack in tin, glass, cellophane, fiber, paper or wood, or ship wood or fiberboard, La Porte Conveyor Belting will save you time and labor and minimize spoilage. There are no sharp edges to injure workers . . . no fabric to harbor germs . . . and its rugged flexible construction withstands impacts at the loading chute. In addition, it will not creep, weave nor jump on pulley stand.

The open mesh feature permits the circulation of air, steam and heat around products in process and facilitates cleaning with steam gun or scalding water. Heat, cold and acid resistant.

Ask your Supplier Today. Available in any length and practically any width.

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Sold by nearly 150 Mill Supply Distributors throughout the U. S. A. See your supply house or *write for Catalog* T-1739.

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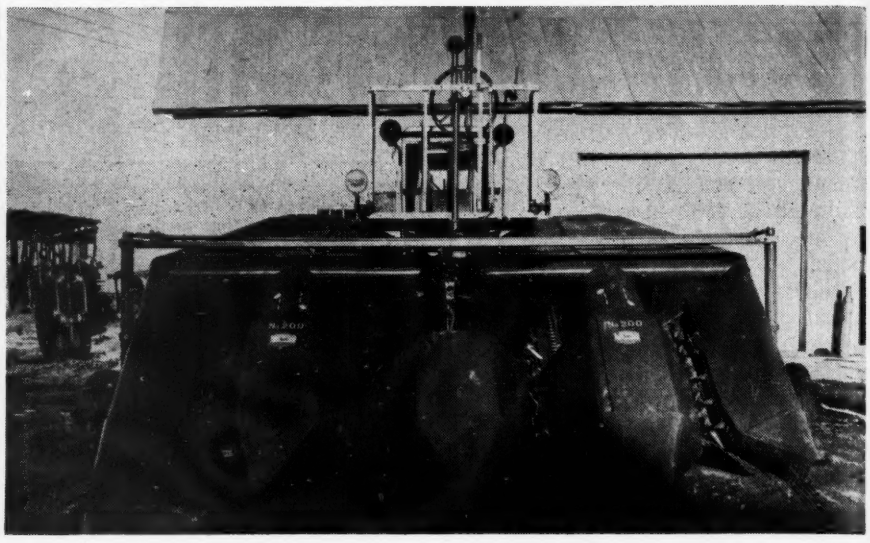
IMPULSE
STEAM TRAP



FOUR-ROW CORN PICKER

This might be the only four-row corn picker in the world. At least its Minnesota inventor, Arthur Abel, hopes it is. The machine's power plant operates the picking rollers, provides locomotion and pulls a wagon behind the picker.

proposed, round and flat. Sizes of canned beans proposed are six in number, and are also shown in tabular form. Number designations are from size 1 to size 6. Word designations include the following: Tiny, small, medium, medium large, large, and extra large.

In ascertaining the grade, maturity is given a weighting of 40 percent; absence of defects is weighted at 35 percent; color 15 percent; and clearness of liquor 10 percent. Approximately two pages in the Federal Register are devoted to the precise method of ascertaining the rating of each of these factors within the percentages indicated.

Tolerances for certification of officially drawn samples are indicated, and a scoresheet completes the proposed amendment. July 25 was the final date for submission of data, views, or arguments in connection with these proposed revisions.

Food Standards

FOOD standards activities up to July 1 can be summarized in the following developments:

Canned tomatoes amendment, to permit additional optional calcium salts as firming ingredients, final order published in Federal Register June 14, page 3887. No change from tentative order, discussed in July issue, page 136.

Canned fruits and fruit cocktail amendment, to permit optional rum seasoning, hearings closed May 7; still awaiting tentative order of Administrator.

Cheeses, natural and processed, domestic and foreign, hearings continuing on July 14 after two-week recess. During the latter two weeks of June, representatives of French and Swiss governments offered testimony and domestic representatives spoke for Italian cheeses. On resumption of the hearings mid-July, testimony on Dutch and Norwegian cheeses is expected, and possibly some on Danish cheeses also. Domestic cheese manufacturers have indicated that vitamin addition will also be discussed.

Canned shrimp standards of fill of container amendment was scheduled for July 8 hearings.

Canned oysters standards of fill of container amendment and new standard of identity were scheduled for July 10 hearings.

Salad dressings, canned corn, and frozen fruits were discussed at informal meetings of the Food Standards Committee last March, but no hearings dates have been set for any of these commodities.

Policy statements by the Federal Security Administrator interpreting Food and Drug philosophy will supersede the old Trade Correspondence, which has been publicized in FOOD INDUSTRIES during the past decade.

These policy statements, two in number so far, are published in the Federal Register as they appear, in order to conform with the requirements of the Administrative Procedures Act of 1946. The first of these policy statements was made in February, relating to canned oysters fill of container (see March issue, page 136). The second appeared in early June, relating to the labeling of shelled peanuts (see page 138, this issue).

Studies on Sugar Use Reveal New Problems

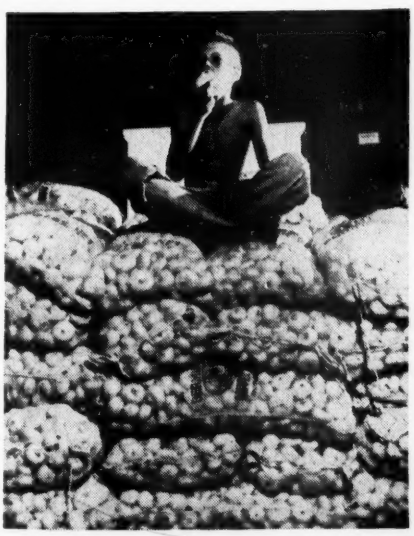
THE consumption of sugar is evidently not equivalent to the apparent disappearance as commonly reported, nor equal to the reported purchases for certain uses. Comparison of sugar in the diet between various nations is also subject to startling corrections when accurately computed.

These are only two of the facts already disclosed by a fundamental inquiry regarding the food habits of the American people and the actual use of sugar, both as a food and for other applications. This work has been initiated, according to the announcement of Dr. Robert C. Hockett, by Sugar Research Foundation of New York City. Dr. Francis Joseph Weiss, a chemist and economist, is conducting the investigation from a Washington, D. C. headquarters. His early inquiries have already disclosed substantial uncertainties apparently hitherto overlooked. Results of his studies will be published by the Foundation from time to time.

Saves Peach Color

DISCOLORATION of canned freestone peaches can be greatly reduced by steaming them longer before removing the skins, report A. M. Neubert and G. H. Carter of the Fruit and Vegetable Products Laboratory maintained cooperatively by the Department of Agriculture, and the Washington State Agricultural Experiment Station at Pullman.

Sealing the cans with a minimum amount of oxygen also reduces discoloration, makes the sirup clearer,



Press Association

NO TEARS?

This lad bites deep—it says here—into a North Texas sweet Bermuda onion as harvesting got under way on the 11,000 acre onion strip around Garland, Tex.

A BETTER Strainer to "police your pipelines"

• FIRST—*The Screen*, a high-grade woven Monel wire basket that catches solids—lets condensate, oil or other fluids flow freely.

• SECOND—*Finish*. Cadmium plated for protection against corrosion and for better appearance.

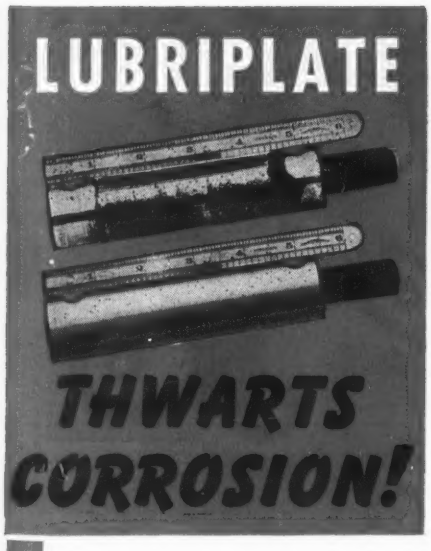
• THIRD—*Easily Cleaned*. Blow-off bushing made for easy removal. Bushing and Screen come out together. Screen automatically aligns on reassembly.

• THOUSANDS IN SERVICE—Sold by nearly 150 Mill Supply Houses.

6 sizes from ½" to 2" for pressures up to 600 lb. Reasonably priced. See your supply house or write for Bulletin S-201.

YARNALL-WARING COMPANY
127 Mermaid Ave. PHILADELPHIA 18, PA.

YARWAY STRAINERS



These originally identical shackle pins from a ten ton truck were used in a comparative lubrication test for a period of one year. A well known conventional lubricant was used on the upper pin. Note the pitting from corrosion, also the excessive wear. LUBRIPLATE was used on the lower pin. Its surface remained bright and true as when the test began, proof that LUBRIPLATE is different . . . better.

LUBRIPLATE

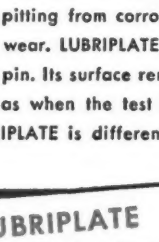
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE

Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.



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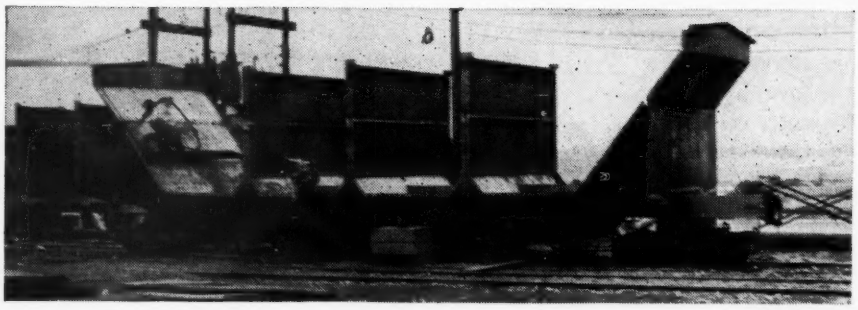
NEWARK 5, N. J. TOLEDO 3, OHIO
DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK



Wide World

WHEAT COMPARTMENTS IN THE MAKING

With wheat hauling cars of any kind so seriously short, the covered, four compartment hopper cars now being built for the Kansas City Southern Ry., will be a luxurious and welcome addition. They will have a capacity of 70 tons.

and rids the sirup of a red color that comes from the fruit. Tests of the ripening quality of freestone peaches showed that fruit harvested when firm-ripe is better for canning and freezing than fruit that becomes ripe during processing. Fruits that ripen at moderate temperatures yield better flavored products for canning and freezing than fruits ripened at high temperatures and humidities.

Soya Corp. Produces A New Edible Oil

A new edible virgin oil, produced from soybeans, will soon be put into commercial production by the Soya Corp. of America, that company reveals.

Developed in the corporation's own laboratories, the oil is said to have excellent keeping qualities. Carload shipments will be made up, according to present plans, at a price substantially below that of fine quality olive oil.

Beans from which the oil is pressed are cured by the Horvath process, owned under patent by the Soya Corp.

Process Butter Rules Modified Slightly

CONDEMNATION of process butter or of ingredients found to contain immature stages of insects is the principal requirement of an amendment proposed in the Federal Register in June. The section now requiring *outdoor* air to be used in the manufacture of process butter would be amended to read, "Air used in aerating butter oil in connection with the manufacture of process or renovated butter shall be pure and clean and free from contamination of any kind." Also proposed is an additional denaturing agent of 1.5 parts of kerosene per 100 parts of condemned process butter or condemned prospective ingredients.

Cereal Research Grant Given to Kansas State

KANSAS STATE COLLEGE, Manhattan, Kan., has been granted $7,000 from the Williams-Waterman Fund of the Research Corp. of New York for research in the nutritional significance of the use of enriched flour and cereals.

The research project will be directed by Dr. Beulah D. Westerman, associate professor in the Department of Foods and Nutrition. The grant is the first made to the College by the Research Corp. for this work. It is effective until July 1, 1948.

Texas A & M Adopts Food Tech Course

TEXAS A. & M. will join the ranks of colleges offering courses in food technology, this fall, when a five year course is to be inaugurated. Science, engineering and business will be stressed, while students may elect horticulture, meats, dairy, fisheries, cereals, or vegetable oils for specialization.

In addition to the practice provided in these several fields on the campus at College Station, Tex., actual experience in industry will be among the requirements for graduation.

Increase Palatability In Soybean Drying

A FRESH vegetable flavor, which increases palatability, is achieved if green soybeans are used for drying instead of mature beans. These beans should be blanched for at least eight minutes, often up to 16 minutes, to give a good firm texture without decrease in either palatability or other quality characteristics. These are the conclusions and recommendations of the Department of Agriculture for those who want to add to the American diet a new vegetable that keeps well.

DISTRIBUTION

Ask Canned Foods Use In European Programs

STATE canning association, cooperative canners, and other representatives of the food industry were trying early last month to have processed foods included in any future program of aid to Europe.

Representatives of these groups were already assured that processed foods would be given consideration by the War and State Departments in deciding how much of the quantity and kinds of foods would be bought for European relief.

A hearing on the problem had been scheduled for July 10 by a special subcommittee of the House Agriculture Committee, at which time representatives of the interested groups were to appear.

The problem stems from carryover of some 193,000,000 cases of canned goods, according to Department of Commerce figures, on April 1. This is 68,000,000 cases more than were in inventory of producers and distributors on the same date a year ago. Many food processors have on hand excess unsold inventories from last year's crop with prospects for another large crop coming in this year.

What the canners and processors would like to do is have the government purchase from excess inventories held by distributors in order to make way for this year's crop. However, the co-op canners are said to take the position, that the government, if it does buy processed foods for relief, should buy at the lowest price possible. That is, from canners and not distributors.

The program is up against one obstacle that may be insurmountable: The fact is that more calories per dollar and per ton can be shipped abroad in cereal grains, which have comprised the bulk of U. S. relief shipments to date. Argument presented to counteract this is that foreign shipments should be determined by considering their effect on entire U. S. economy, including agriculture. This means that surpluses of processed foods should at least get consideration, since presence of the excess stocks would ultimately back up and cut canners' purchases from growers.

Another argument that will be presented is that government officials should keep present food processing capacity intact, at least for a period of time, to prevent any potential cutback that would be difficult to expand.

Protect your food products from bacterial contamination by sanitizing with LO-BAX . . . *especially during warm weather when bacteria multiply faster.*

Lo-Bax, the concentrated, fast-killing chlorine bactericide, helps prevent costly food spoilage and improves quality standards by rigidly controlling bacteria and sanitizing all surfaces with which food comes in contact.

Easy to handle — winter or summer — Lo-Bax kills bacteria almost instantly . . . at low cost. It contains 50% available chlorine, dissolves quickly in water — hot or cold, hard or soft — to make clear bactericidal rinse solutions.

Order Lo-Bax from your supply house today! It's just what you need for safe, sure control of bacteria. THE MATHIESON ALKALI WORKS (INC.), 60 E. 42nd St., New York 17, N. Y.

LO-BAX
CHLORINE BACTERICIDE
50% AVAILABLE CHLORINE

LO-BAX SPECIAL—A superior chlorine bactericide in granular form—packed in 2½-lb. bottles, ½ doz. to the case; and in 1-lb. bottles, 1 doz. to the case.

LO-BAX POWDER—A highly efficient chlorine bactericide packed in 1¾-lb. bottles, 1 doz. to the case.

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Pioneer Manufacturers of Chlorine Products for Over Fifty Years

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Carbonic Gas . . . . Ammonia, Anhydrous & Aqua
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Hard Working
PROTECTION

HODGMAN APRONS
for Safety and Efficiency
in the Food Industries

No. 7100

Combining maximum protection with hard-wearing quality and free action comfort, Hodgman Industrial Aprons have been found particularly adaptable to industries in the food field.

No. 7075 (above) is a rugged, serviceable white apron widely used in the dairy, canning and packing industries.

No. 7100 is a strong black apron resistant to dilute acids and abrasion. The No. 7100 apron is used especially for acid protection.

No. 7130

No. 7130 is a white apron made especially for use in canning products with liquid content. Made of sheeting and coated with general purpose rubber on both sides, it withstands much abuse and affords long service.

Send for complete details regarding Hodgman Aprons for industrial use.

HODGMAN
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FRAMINGHAM, MASS.

Wide World

GREENHOUSE CORN

These are the parent strains of Waxy Iowa Hybrid 939 corn, growing in the greenhouse at U. S. Plant Industry Station, Beltsville, Md. These varieties are tailor made to suit the soil and climate of the section of the country in which it is to be grown.

Plan More Statistics On Freezer Storage

THE NATIONAL ASSOCIATION OF FROZEN FOOD PACKERS and the National Association of Refrigerated Warehouses have completed joint plans to provide the frozen food industry with more comprehensive data on holdings of frozen fruits and vegetables.

Up to this time, the Dept. of Agriculture's monthly cold storage report has not shown a breakdown of holdings of frozen fruits and vegetables by container size, and the industry feels a growing need for specific information on the volumes of stocks packed in retail, institutional and industrial sizes.

Meetings were therefore held to work out a practical method of obtaining this information through established USDA channels. Those present at the last meeting, held in Philadelphia on June 12 were C. Courtney Seabrook, president, and L. S. Martin, secretary-treasurer, of the National Assn. of Frozen Food Packers; Horace Wilson, president, and William O'Keefe, executive secretary, of the National Assn. of Refrigerated Warehouses. Following this meeting it was announced that for nine major frozen fruit and vegetable items (strawberries, raspberries, peaches, asparagus, spinach, cut corn, snap beans, lima beans, and green peas) the USDA would be requested to report separate figures for retail and larger container sizes.

This request has been placed before W. C. Crow, head of the Marketing Facilities Branch, USDA, and indications are that the program will be put into operation.

Industrial Rationing Tied to Sugar Supply

WHILE Secretary Anderson has stated that he is not "wedded" to continuation of sugar rationing for industrial users through October 31, indications in Washington at the end of June pointed strongly to such continuation unless the supply improves radically.

An increase of industrial user allotments from 75 to 85 percent of their base for the third quarter was announced June 24, by Sugar Rationing Administration. This action was substituted for an earlier order issued by SRA—and canceled the same day by Secretary Anderson—which would have permitted institutional users of sugar to transfer ration evidence to an industrial user, providing the sugar was returned to the institution in the form of a sugar-containing product.

This earlier order, providing for joint application for additional sugar by the institutional user and the industrial user, was revoked when it was learned that a soft drink bottler had gotten word of the order before it was issued, and had distributed to institutional users printed forms to be filled out and signed for additional sugar. Competitive bottlers were up in arms upon learning that the order had leaked out and that their institutional customers were already signed up under the terms of the new order before it was issued.

A further liberalization, on June 10, now permits fruit canners and pickle packers 100 percent of their 1941 use, or the amount necessary to produce fancy grade on a specified per case basis.

Industrial users are still required to register with SRA, to apply for allotments or provisional allowances, and to use in the manufacture of their sugar containing products only the sugar they obtain by surrender of ration evidences.

Furthermore, SRA emphasized that all suspension orders prohibiting industrial users, wholesalers, and retailers continue in full effect. Only suspension orders applicable to institutional users have been revoked by the end of rationing.

However, by an order dated June 20, SRA regulations now permit sugar made from sugar-containing products to be used ration-free—providing ration evidences have already been submitted for the sugar-containing product, or the sugar-containing product has been imported. Such sugar is not chargeable against the industrial user's inventory, and may be used in excess of his allotment.

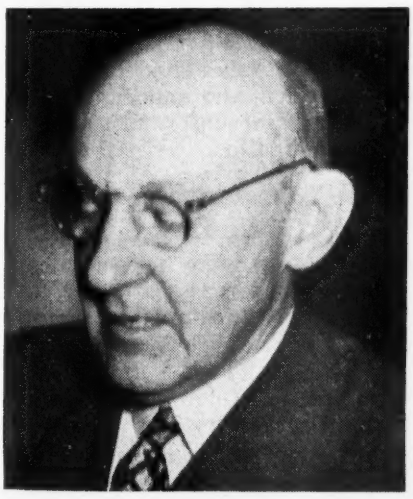
Lag in Output of Tin Darkens '48 Prospects

WHILE container manufacturers are not particularly worried over their own tin and tinplate situation for the rest of the year, the outlook for 1948 is generally dark.

By the end of the year, pig tin stocks held by the Office of Metals Reserve will be largely depleted. U. S. Consumption of tin has been exceeding U. S. supply by 1,500 tons a month, and the prospect is that we will move into 1948 with only 50 percent of the tin stocks that we need.

The government-owned tin smelter at Texas City, Tex., is continuing to operate in excess of current receipts of tin concentrates from Bolivia—and U. S. allocations of world tin production from the combined tin committee have not been as large as anticipated because of the lag in recovery of tin production in the Far East.

However, it is mainly to the Far East that officials are looking for the increased supplies in 1948 to close the gap between U. S. tin consumption and supply.



Harris & Ewing

FOOD RATIONING

Dr. Leverett S. Lyon, chief executive officer, Chicago Association of Commerce and Industry, told Congress early last month that the country may have to go back to food rationing if the present trend continues. He asked that a rationing plan be studied.

The SEALTITE Bag Sealer
CUTS PACKAGING COSTS

● Consolidated's SEALTITE Bag Sealer invariably results in important savings in packaging in paper bags. Some users report costs reduced as much as $500.00 per month per machine over previous methods of packaging.

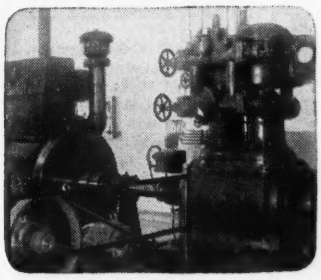
SEALTITE handles any standard gusseted bag of 2 to 10 lbs. capacity. It settles, shapes and seals at speeds ranging from 30 to 50 bags per minute. SEALTITE produces a square, flat-topped sift-proof package that stacks like a carton. Any product usually packed in a paper bag can be packed in a SEALTITE package.

Write for information, prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

FRICK TRADE MARK

Home Economics Department, Thomasville Ice & Mfg. Co.



One of Five Frick Refrigerating Machines in Service at Thomasville.

How This COMMUNITY REFRIGERATION CENTER Serves Southcentral Georgia

The Thomasville Ice and Mfg. Co. produces 130 tons of ice daily, ices many railway cars and trucks; stores great quantities of pecans, one-half million pounds of peanuts, quantities of pimento peppers, blueberries, pears, okra, potatoes, seed corn, tung oil nuts, and lupin seeds; rents 475 frozen-food lockers; conducts home economics demonstrations; will soon install bulk quick-freezers.

Its two plants at Thomasville give Southern Georgia and Northern Florida an invaluable service.

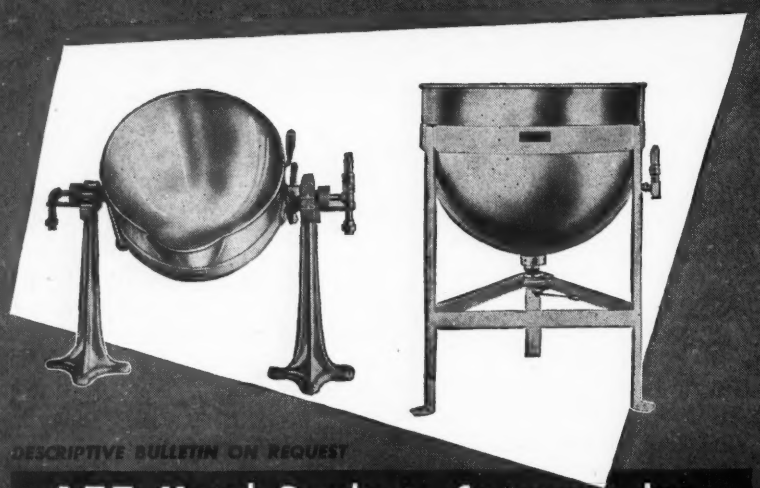
This firm has used Frick refrigerating and ice-making equipment exclusively for 35 years.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

LEE Kettles

FOR EVERY PROCESSING NEED

Where Corrosion-Resistant Equipment is used

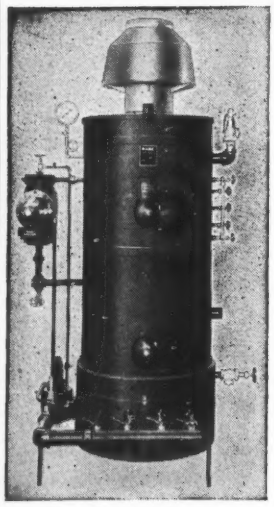


DESCRIPTIVE BULLETIN ON REQUEST

LEE Metal Products Company, Inc.

415 PINE STREET . . . . . PHILIPSBURG, PA.

All Lee Kettles are made to A.S.M.E. Code



The KANE Boiler, in sizes 1 to 30 H.P., built to A.S.M.E. specifications.

CLEAN STEAM

AS YOU WANT IT . . .

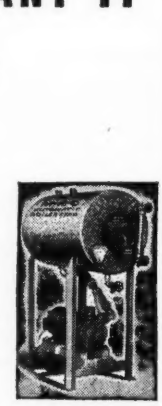
WHERE YOU WANT IT

with the KANE

AUTOMATIC GAS-FIRED

STEAM BOILER

Investigate *Engineered Steam.* It's a steam source . . . compact, self-contained, and "tailor-made" for your job . . . that includes: the study and solution of your problem; the correctly sized and constructed KANE Automatic, Gas-Fired Boiler; the M-K-O Automatic Boiler-Feed to provide a *constant* water level for highest boiler efficiency.



M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

Although orders cannot be filled immediately, we'll try to fill your urgent needs as soon as possible.

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE.

Bills Would Strengthen F&DA Food Control

THE authority of the Food and Drug Administration to seize a commodity when it has come to rest after shipment in interstate commerce was the subject of hearings held last month by a subcommittee of the House Committee on Interstate and Foreign Commerce.

Two bills have been introduced, which would fill the gap in F&DA power left by a recent Supreme Court decision that held that the Food & Drug Act, as written, did not confer this power of seizure on the F&DA.

The fact that there was no opposition to the companion bills (H.R. 3128—H.R. 3147) and that they were supported by food and drug trade associations pointed to the likelihood of passage before the Congress goes on vacation the end of July.

Producers May Protest If Trade Pacts Hurt

THE U. S. TARIFF COMMISSION has issued new rules for procedures in requesting investigations under the "escape" clauses in international trade agreements.

This means that if trade concessions granted by the U. S. allow importation of a commodity in such increased quantities as to cause or threaten injury to domestic producers, the government on determination of the damage can withdraw the concession or modify it.

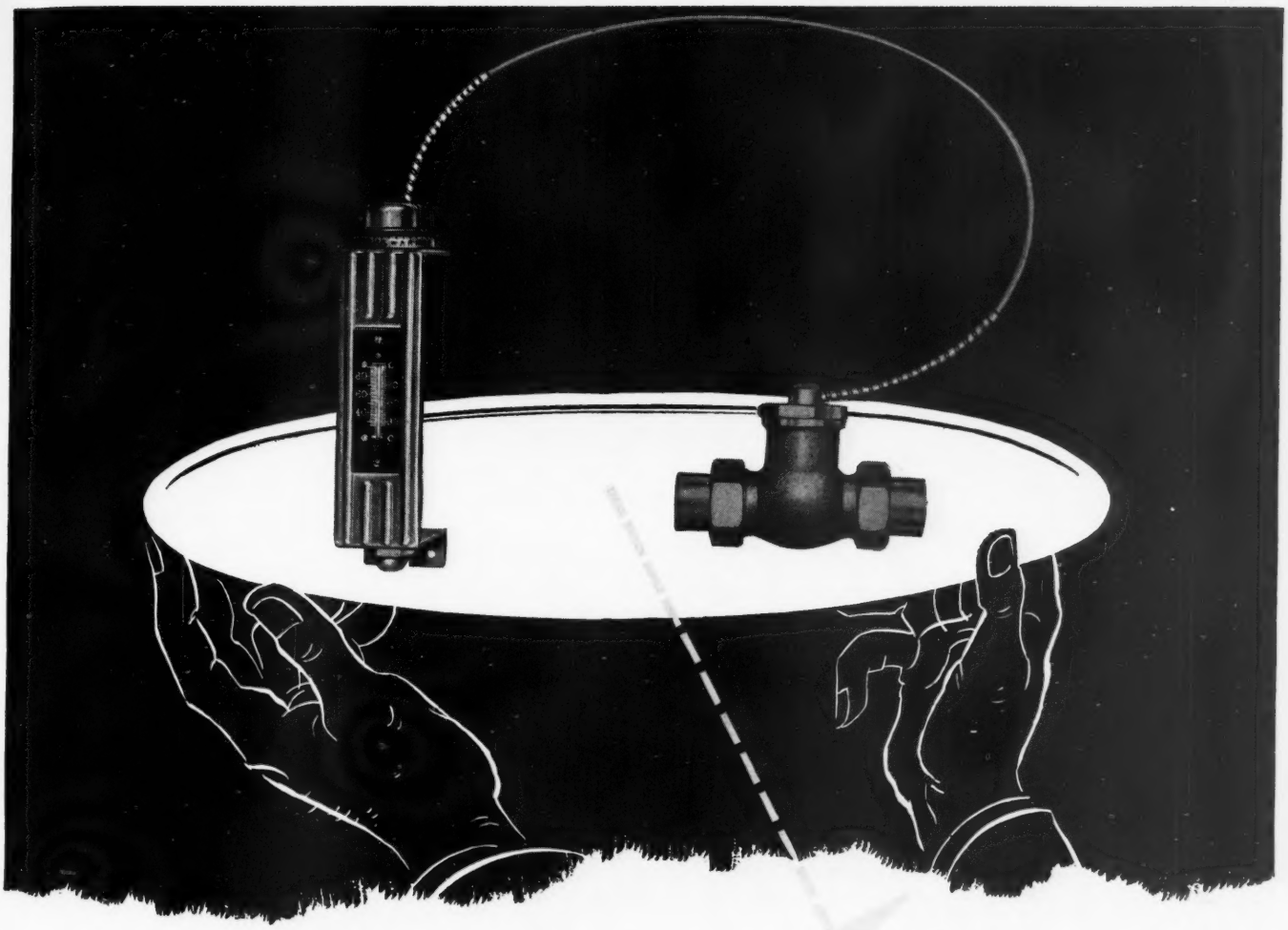
The commission makes the investigations on petition from the producer injured or threatened. Findings are to be reported to the President with appropriate recommendations.

With a clearly stated request for investigation, the applicant should file supporting information to aid the investigation.

PMA Amends Inspection Of Poultry & Rabbits

APPLICATIONS for inspection and certification of dressed poultry and dressed domestic rabbits should be made on a new form proposed by Production and Marketing Administration. The new form appeared in the Federal Register on June 11, pages 3804 and 3805, and was to be effective on July 11.

In the same issue of the Federal Register instructions on sanitary requirements for official plants handling poultry and rabbits were printed in full. These instructions were originally issued on October 17, 1945, and are currently in effect.



COMFORT ON ORDER...
as you want it!

● You can count on comfort-conditioning throughout offices and in plants all winter long—with Fulton Sylphon Temperature Regulators on the job. These sturdy, self-contained, self-powered controls maintain healthful, comfortable temperatures—do it automatically. The No. 7 unit heater control shown on this page, for example, is highly sensitive and fully modulating. It acts immediately to keep room temperatures "set" as wanted. The easy-to-read dial makes regulation easy, quick and accurate. The thermostat unit can be installed at the best point on wall or column for regulating area temperature. Accurate—practically indestructible—money-saving, too, because Sylphon Temperature Regulators help keep fuel costs down. Other Sylphon regulators for duct systems, etc. Write for Catalog PG-220 giving complete information.

FIRST WITH BELLOWS

THE FULTON SYLPHON CO. KNOXVILLE 4, TENN.

FULTON SYLPHON

Temperature Controls • Bellows Devices • Bellows Assemblies

Canadian Representatives, Darling Brothers, Montreal

For Fast Moisture Testing

USE A **Steinlite**

When used by an experienced operator the Steinlite is "the one minute moisture tester." It is easy for anyone to become an experienced operator for no special education or training is necessary. About all one does is (1) weigh out a sample, (2) pour it into the Steinlite hopper, (3) read a meter dial, and (4) compare the reading with a chart showing percentage of moisture.

Steinlite tests wide variety of products—dehydrated foods . . . dried eggs, nuts, cocoa, etc. There are more Steinlites in use than all other electric moisture testers combined. Precision built by a firm of radio engineers and calibrated against official oven methods. Sold on free trial basis. No money down. Write for circular.

734 CONVERSE BUILDING

CHICAGO 6, ILLINOIS

SEEDBURO EQUIPMENT COMPANY

FOR CONTROLLED

Cold Storage

Ship to one of the South's leading cold storage warehouses. Completely new, modern freezer-holder space now available. Careful handling and storage at proper temperatures . . . financial protection. Write for fully illustrated folder.

(A Division of Colonial Ice Co.)

Roanoke Ice & Cold Storage

ROANOKE, VIRGINIA

RAW MATERIALS

Producers Agree Upon Sugar Act Amendments

THE domestic sugar producers, having gotten together on a sugar bill for the first time in history, were wondering at the end of last month whether the Sugar Bill of 1948 would get stuck in the logjam at the end of this session of Congress—or go through both Houses without a hitch, as they were hoping.

Having come up with a compromise bill supported by all sections of the domestic sugar industry and by the Administration, they were hoping that no last minute obstacle would appear to hamper passage as a result of a fight on the floor of either House.

The bill represented a compromise—but the fact that the domestic industry agreed to its provisions and were represented by a single spokesman at the hearings was a strong factor favoring passage.

The annual quotas agreed upon are as follows:

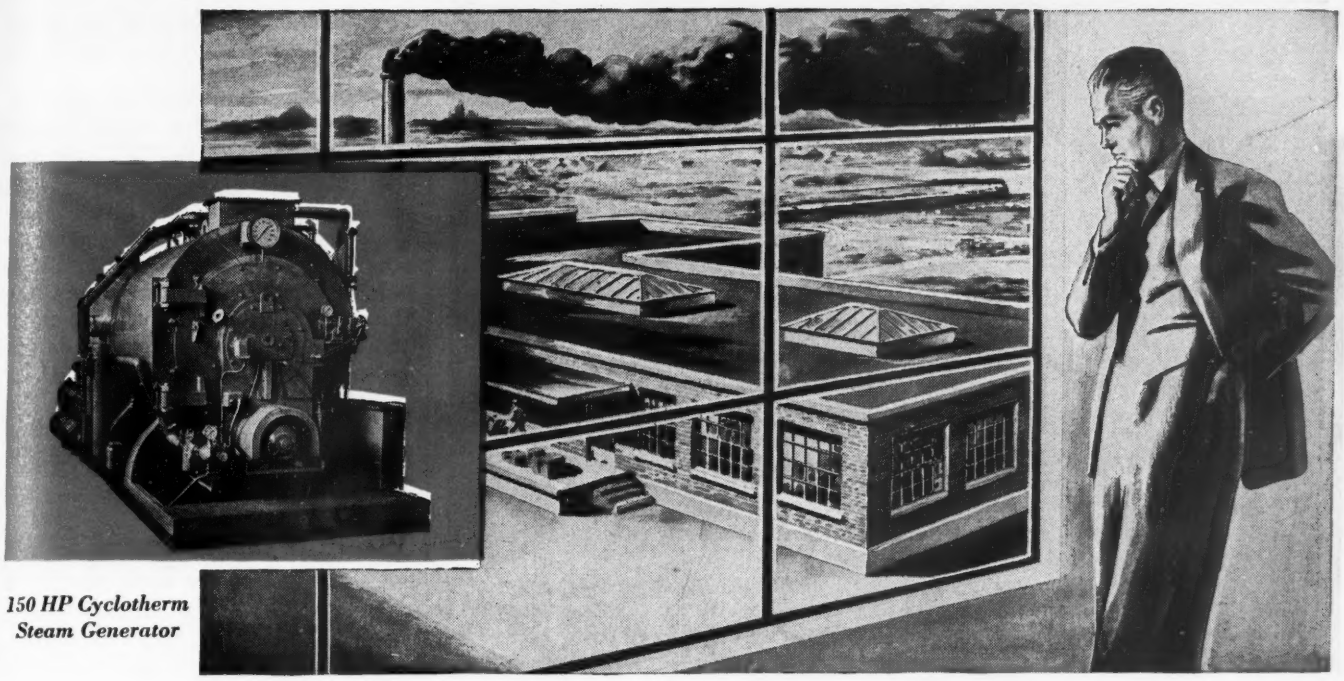
	Tons
Domestic beet producers	1,800,000
Mainland cane producers	500,000
Hawaiian producers	1,052,000
Puerto Rico	910,000
Virgin Islands	6,000
Philippine Islands	952,000

The balance of U. S. needs would come from Cuba, with minor exceptions. Since the U. S. producers have never filled their quota, the Cuban sugar interests are given a sizeable market for their crop, which this year is estimated at a record-breaking 3,600,000 tons.

Wide World

CULTURED AGRICULTURING

This is a futurist's design of an air conditioned farm tractor. Besides protecting the farmer from the weather, the cockpit keeps him entertained with a radio. Arthur Radebaugh, Detroit, dreamed it up.



150 HP Cyclotherm Steam Generator

Are you Beating Competition in cost of steam—*if not*

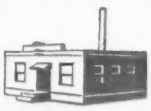
WRITE CYCLOTHERM

Flexibility in operating a single Cyclotherm, or a battery of several, meets all demands for maximum or minimum production of steam economically without impairment of operating efficiency.

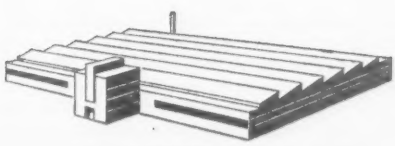
The automatic modulating steam pressure control system of a Cyclotherm Steam Generator provides the proper quantitive fuel-air relationship for all firing rates, but with oil (or gas) and air pressures constant.

Such soundly economical efficiency accounts for the steadily increasing purchases of Cyclotherms by both large and small producers of steam for processing, power and heating. These customers did not buy Cyclotherms with their eyes shut. They knew that the efficient production of steam is a profit-building factor in all competitive business fields.

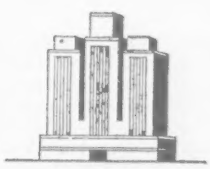
If you have a problem based on reducing operating or maintenance costs in steam production, write or telephone us. Your inquiry will receive our immediate attention.



POWER



PROCESSING



HEATING

CYCLOTHERM STEAM GENERATORS

CYCLOTHERM CORPORATION, 90 BROAD STREET, BOX 101 Z, NEW YORK 4, N. Y.

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SPICEOLATES
THE BETTER SPICE FLAVORS
Spiceolates have many advantages — and can be used not only to extend your supplies of natural spice oils, but also as complete replacements for them. Spiceolates are very soluble in water and remain in good condition indefinitely under most any circumstances. Write us today for your copy of our New Spiceolate Folder.
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NATIONAL AIROIL FUEL OIL - GAS BURNERS
TYPE "SAL"
OIL BURNER assures
HIGH FUEL CAPACITY . . . thus
REDUCING THE NUMBER OF BURNERS NEEDED
Type "SAL" Steam Atomizing Oil Burner is a large capacity burner with great flexibility of performance throughout a wide operating range. Because of thorough atomization it produces a clean, steady, well-defined flame, which completely burns the fuel oil. It reduces the tendency to smoke, form soot or incur carbon losses. Type "SAL" Oil Burners are adaptable to dual fuel systems on large boilers. They can also be used with comparable convenience and economy in pulverized coal registers, open hearth furnaces, rotary cement burning kilns, large dryers and many other furnaces. It is frequently used to fire fuel oil above existing coal stokers. For detailed information, write for Bulletin 24.
NATIONAL AIROIL BURNER CO., INC.
Main Offices & Factory: 1272 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PA.
Texas Office: 2nd National Bank Bldg., Houston

Total tonnage available for consumption this year has been estimated at 7,150,000 tons.

Quota tonnage that is not fulfilled by the domestic sugar industry is pooled, and the bill provides that Cuba may supply up to 95 percent of the tonnage in the pool, the remaining five percent going to other producing areas. Since neither the domestic producers nor the Philippines are likely to meet their quotas, the Cuban crop is expected to find a market in the U. S.

The bill raises the quota of the U. S. producers from 3,715,000 tons under the Act of 1937 to 4,268,000 tons.

Walnuts and Peanuts Get New Regulations

WALNUTS and peanuts were the subjects of two independent official actions taken during June.

New definitions of "merchantable walnuts" and "cull walnuts" grown in California, Oregon, and Washington were proposed as part of Production and Marketing Administration regulations for handling of these western products. Other definitions and amendments in the existing marketing agreement and marketing order were also proposed to bring the regulations up to date. The proposals and definitions appeared in the Federal Register for June 14, pages 3894 to 3898.

Shelled peanuts in sacks, whether or not shipped in carload lots, should bear the information required by the Federal Food, Drug, and Cosmetic Act for foods in package form. This information includes (a) the name of the product, (b) an accurate statement of net weight, and (c) the name and place of business of the packer or distributor. This information should be printed or stenciled on each bag or placed on tags which are securely attached, according to F&DA which has discovered that a number of interstate shipments have failed to bear the required labeling. This policy statement was published in the Federal Register on June 6, page 3689.

Chlorite Treatment Protects Raw Sugar

A NEW process for treating raw sugar with sodium chlorite, which inhibits fermentation while at the same time exerting slow bleaching action, has been developed at the National Bureau of Standards. Since there is considerable loss of raw sugar by bacterial action in

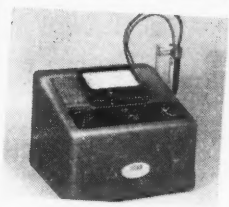
How much is waste costing in YOUR plant?

Here's how you can reduce it with BECKMAN pH CONTROL

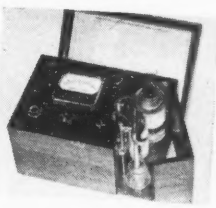
IN industry after industry Beckman pH Control is reducing costs, minimizing waste, saving time and greatly increasing production efficiencies. Have *you* investigated what this amazing new profit tool can do in your plant? *Wherever there's water, there's pH.* So if you use water or water solutions of *any* kind . . . whether in pulps, liquids, or semi-solids—in process solutions, waste disposal or any other way . . . chances are that Beckman pH Control can help you do the job better—*for less.* Here, for example, is how others are slicing costs with Beckman equipment . . .

TWO BECKMAN pH INSTRUMENTS IDEAL FOR FOOD APPLICATION

The complete line of Beckman pH instruments includes equipment for every pH requirement, from specialized laboratory research to large-scale automatic process control. The two Beckman instruments below are widely used in the food industry for general pH control applications. . . .



THE BECKMAN MODEL H—operates directly from standard 110 v. 50/60 cycle A.C. current. Features simplified operation, high accuracy, full temperature compensation and maximum stability. Can be used with a wide range of regular and special-purpose Beckman Glass Electrodes.

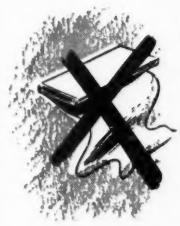


THE BECKMAN MODEL M—operates from completely self-contained long-life power supply for maximum portability in plant and field applications. Simple to operate, this compact, highly accurate instrument has many unique operating features, and, like the Model H, can be used with a wide selection of Beckman pH Electrodes.

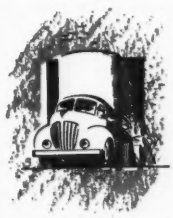
Write for Descriptive Literature.

SAVING CHEMICALS: By Beckman-controlling processes where chemicals are used, operations can be controlled so closely that overdosage and excess use of chemicals can be practically eliminated. Not only does this cut chemical costs, but it also assures more uniform processing, more accurate production control and greater plant efficiency.

REDUCING CORROSION: More and more plants are discovering the many advantages of reducing corrosion with Beckman pH Control. By Beckman controlling-process operations, these operators are able to regulate acidity and alkalinity — and thus neutralize excessively corrosive solutions before they damage costly plant equipment.



MINIMIZING REJECTS: Beckman pH Control is also making important savings by assuring more uniform quality of production. In many operations only a small change in pH makes a great difference in operation of the processing solutions. By Beckman-controlling the solutions, run after run is processed with identical quality, thus reducing rejects, cutting production costs and making greater savings in over-all efficiency.



SAVING TIME: Just as heat can frequently speed up chemical processes, so proper pH control can often save on processing time. Here again, even a relatively small saving on each production run quickly builds up to tremendous over-all savings in labor and plant overhead.

WHEREVER THERE'S WATER, THERE'S pH!

Let our engineering staff study *your* particular pH problem and make recommendations on the type of equipment best suited to your requirements. No obligation, of course.

For helpful information on pH control, send for this free booklet "What Every Executive Should Know About pH!"

BECKMAN

BECKMAN INSTRUMENTS • NATIONAL TECHNICAL LABORATORIES
SOUTH PASADENA 18 CALIFORNIA

INSTRUMENTS CONTROL MODERN INDUSTRIES

transit and storage, the new process gives promise of effecting a substantial saving in the industry.

Several years ago, sodium chlorite appeared on the market as a new commercial chemical recommended for the bleaching of cellulose fibers. As little was known about reactions of the chlorites with carbohydrates, the subject was investigated at the National Bureau of Standards with the object of providing a guide for its application as a bleaching agent.

In the process developed at the Bureau and covered by a patent application (assigned to the Government and allowed March 6, 1947), the raw sugar is sprayed or treated with a solution of sodium chlorite, and the chlorite is allowed to remain with the sugar while it is in transit and storage. During this period the reagent exerts a slow bleaching action and protects the sugar from bacterial fermentation.

It is pointed out that the sodium chlorite solution can be applied with standard spraying equipment. Raw sugar must be centrifuged before it is packed to remove as much of the molasses as possible adhering to the sugar crystals, and the sodium chlorite can be applied at this point in the progress of the sugar from plantation to refinery. Care must be taken in the handling and storage of sodium chlorite and proper precautions exercised in its use as it may have toxic effects.

SCHEDULE OF EVENTS

August

10-13—Southern Bakers Association, annual convention, Oglethorpe Hotel, Savannah, Ga.
11-14—International Apple Association, 53rd annual convention, Statler Hotel, Detroit, Mich.
20-23—National Food Distributors Assoc., Chicago.

September

1-4—American Society of Mechanical Engineers, fall meeting, Hotel Utah, Salt Lake City, Utah.
4-5—Dairy Industry Conference, Stocking Hall, Cornell University, Ithaca, N. Y.
15-19—American Chemical Society, annual fall meeting, New York.
29-Oct. 1—National Coffee Association, annual convention, Ahwahnee Hotel, Yosemite National Park, Calif.

October

6-7—Packaging Machinery Manufacturers Institute, 15th annual meeting, Hotel Sheraton, Springfield, Mass.
20-22—Bakers Supply House Association, annual convention, Edgewater Gulf Hotel, Edgewater Park, Miss.
20-22—Bakers Supply House Association, annual convention, Edgewater Gulf Hotel, Biloxi, Miss.
21-25—Pacific Chemical Exposition, biennial meeting, Civic Auditorium, San Francisco, Calif.
27-29—International Association of Ice Cream Manufacturers, annual convention, St. Moritz Hotel, Miami Beach, Fla.
30-Nov. 1—Milk Industry Foundation, St. Moritz Hotel, Maimi Beach, Fla.
30-Nov. 1—American Bakers Association, golden anniversary convention, Stevens Hotel, Chicago.

FERRY CONTINUOUS POTATO CHIP MACHINE

is completely automatic! Automatic from raw, unpeeled potatoes to finished product. Peeling, slicing, washing, drying, frying and salting . . . all are under perfect control. You can't beat a Ferry Potato Chip Machine.

Also makers of
SLICERS AND AUTOMATIC SLICERS, FEEDERS AND CAN WASHING MACHINERY

J. D. FERRY CO.
129 SO. CAMERON ST.
HARRISBURG, PA.

CASE HISTORY No. 17
One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON
(Per Ton)

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD ✓
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR ✓
CORROSIVE	HEAVY
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT ✓
FREE-FLOWING	VISCOUS

St. Regis Packaging Systems are designed to meet a wide range of product requirements and plant layouts. Packers are available in a variety of sizes and types, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator. Nearly 400 commodities—rock products, fertilizers, chemicals, foods, and feeds — are now being packaged in sturdy, low-cost multiwall paper bags.

Changes in Food Supplies

(Indicators)

Stocks and Storage

The following canned items represent combined wholesale and packer stocks.

Canned tomato juice stocks, including cocktail and mixtures containing 70 percent or more tomato juice, were estimated at 12,042,000 actual cases on June 1. This compares with 2,565,000 cases on June 1, 1946, but is a drop from the May 1 holdings of 5,611,000 cases.

Canned green and wax beans held in stock June 1, totaled 6,052,000 cases, compared with 3,589,000 cases on June 1, 1946 and 6,664,000 cases held on May 1.

Canned corn held on June 1, came to 9,186,000 cases, compared with 4,186,000 cases a year ago and 11,969,000 cases on May 1.

Canned peas in stock amounted to 14,260,000 cases, June 1, as compared with 4,857,000 cases a year ago, and 16,428,000 cases the previous month.

Canned tomato stocks stood at 4,509,000 cases, June 1, up from 966,000 cases a year ago, but a decrease from the 5,611,000 cases held May 1.

Frozen fish and shellfish, held on June 1, amounted to 79,732,590 lb. This was 14 percent above May 1, but compares with 84,725,097 lb. held on June 1, 1946.

Freezer occupancy stood at 74 percent on June 1, an increase of one point over May 1.

Cooler occupancy moved up during May by three points, standing at 68 percent on June 1.

Production

Creamery butter production, in May, was estimated at 145,545,000 lb., 26 percent above April and 27 percent more than the May, 1946, output. Production, however, was 22 percent under the five-year average for the month.

Canned evaporated milk production, in April, totaled 321,200,000 lb., an 8 percent increase over April, 1946. During the first four months of the year production came to 1,008,500,000 lb., a gain of 12 percent over the same period last year.

Canned condensed milk output reached 11,750,000 lb., in April, a gain of 15 percent from a year earlier and 9 percent above the five-year average. Production rose 36 percent from March to April, this year, compared with a 2 percent gain in 1946 and an average increase of 12 percent in the 1941-45 period.

Dry whole milk reached an output of 10,950,000 lb. in April, which was a drop of 37 percent from April, 1946, though a 5 percent increase over March. The major portion of this decrease was in spray dried whole milk, which made up about 90 percent of the April production of dry whole milk.

Dry nonfat milk solids came to 73,100,000 lb. in April, a gain of 10 percent over March, 5 percent over April, last year, and 32 percent over the five-year average. Of this total, 45,250,000 lb. was spray-dried, a 20 percent increase from April, 1946, and 27,850,000, a 13 percent decrease, was roller-dried.

The frozen fruit pack, in 1946, was 22 percent above the 1945 pack, reaching a total of 430,000,000 lb., according to the National Association of Frozen Food Packers. Frozen vegetables totaled 450,000,000, or 46 percent above the previous year's total.

Indexes

The commodity price index on food, compiled by the New York Journal of Commerce, was 192.0 for the week ending July 5, which compares with 188.9 for the previous week, 193.5 for May and 115.8 for June, 1946.

Business Week's index of business activity was 191.6 for the week ending June 28, 191.6 the previous week, 191.3 a month earlier and 175.7 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded July (thousands)	Total Awarded 1947 (thousands)
Bakery	$ 265	$ 131	$14,692
Beverages	1,654	1,478	12,563
Canning and Preserving	110	....	460
Cold Storage	640	....	2,327
Confectionery	215	....	514
Grain Mill Products	1,072	2,232	24,649
Ice, Manufactured.	....	....	115
Meats and Meat Products	865	55	3,009
Milk Products	1,473	....	4,946
Miscellaneous	1,188	70	12,239
	$7,482	$3,966	$75,514

Basco-TEX

PLASTIC APRONS

Will Not Crack or Peel

POSITIVE PROTECTION against WATER, OIL, ACIDS, ALKALIES

NO LAUNDERING *Just wipe off with a damp cloth. A tremendous cost saver.*

PRICES—COLORS—SIZES

WHITE—
4 Mill Plastic
27 x 36..$ 6.62 per doz.
30 x 36.. 7.53 per doz.
36 x 40.. 7.96 per doz.
36 x 44.. 8.85 per doz.
Full Length Sleeves $6.00 per doz. pair

BLACK or WHITE —8 Mill Plastic
27 x 36..$ 9.00 per doz.
30 x 36... 9.75 per doz.
36 x 40.. 11.15 per doz.
36 x 44.. 13.85 per doz.
Full Length Sleeves $10.65 per doz. pair
Leggins, Hip Length $13.10 per doz. pair

MAROON—Heavy Doubled Coated Neoprene
27 x 36..$12.50 per doz.
30 x 36.. 14.00 per doz.
36 x 40.. 18.35 per doz.
36 x 44.. 20.50 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

BLACK—
12 Mill Plastic
27 x 36..$10.25 per doz.
30 x 36.. 11.15 per doz.
36 x 40.. 14.25 per doz.
36 x 44.. 15.80 per doz.

BLACK — Heavy Double Coated Neoprene
27 x 36..$12.90 per doz.
30 x 40.. 14.00 per doz.
36 x 40.. 18.35 per doz.
36 x 44.. 20.50 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggins, Hip Length $23.50 per doz. pair

BLACK or WHITE —Extra Heavy 20 Mill Plastic
27 x 36..$14.20 per doz.
30 x 36.. 15.90 per doz.
36 x 40.. 20.15 per doz.
36 x 45.. 22.60 per doz.
Full Length Sleeves $14.25 per doz. pair
Leggings, Hip Length $25.75 per doz. pair

ALL PRICES F.O.B. CHICAGO
Minimum order 1 dozen.
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Phone SUPerior 5809

Silicone News

DC DOW CORNING SILICONES

For More Power!

In a rapidly expanding plant like ours, we have had to make maximum use of existing equipment. New machinery and new motors have not been readily available. We have had to use every device we knew of to maintain an increasing production schedule.

We took Silicone Insulation out of our Motor Test Laboratory and put it to work. It has saved us thousands of dollars by keeping motors running day and night, seven days a week, doing the work of motors twice their size.

Condenser water essential to plant operation is pumped through water cooling tower by these two sump pump motors. Motors rated at 30 h.p. (left) and 50 h.p. (right) were rewound with Silicone Insulation to enable them to handle 50% more pumping capacity.

The constant circulation of 5000 gallons per minute of cooling water is essential to our plant operation. The original pump installation, shown above, fell short of the necessary pumping capacity by some 1300 G.P.M.

Here's how we solved that problem. We increased the capacity of the pumps by changing both impellers and one casing. We had both motors rewound with Dow Corning Silicone Insulation to increase their capacity 50%. The motor rated at 30 h.p. is now delivering 40 h.p.; the 50 h.p. motor delivers 60 h.p.; and we are pumping the necessary amount of water. The motors run warm, but we still have power available to increase our pumping capacity by 20%.

Excluding lost time, new pumps and motors installed would have cost us $4,000 with delivery 18 months away. We did the job for $1100 and met our increasing production schedules without delay. Dow Corning Silicone Insulation (inorganic materials + DC 996 Silicone Varnish) may also save you many thousands of dollars. Specifications and prices of Silicone Insulation components are given in catalog No. O 20-2.

See our Exhibit at the Machine Tool Show—Dodge Chicago Plant—September 17-26.

DOW CORNING CORPORATION
MIDLAND, MICHIGAN
New York • Chicago • Cleveland • Los Angeles
In Canada: Fiberglas Canada Ltd., Toronto
In England: Albright and Wilson, Ltd., London

Dow Corning
FIRST IN SILICONES

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

PATENT OWNERSHIP — A three-year investigation of inventions made by government employees and by others using government funds has resulted in an extended report from the Department of Justice to the President, and indirectly to the Congress. The Attorney General in this report urges that more complete arrangements be provided for public ownership of inventions and patents resulting from work paid for by Uncle Sam. Many food companies working with federal agencies may become involved in discussions of this subject as steps are taken through legislation and Executive Order to put into effect the recommendations of the Attorney General. It seems almost certain that many of these recommendations will be adopted officially. Any food technologists dealing with work in which government funds are even indirectly involved must take notice of the resulting question as to ownership of patents.

QUICK TEST—Quick testing of the baking quality of wheat flour can be accomplished in fifteen minutes with little laboratory equipment under a procedure recommended by Production and Marketing Administration. The "Sedimentation Test" measures the rate of settling of the solids from an acidified mixture of flour and water for prediction of probable bread loaf volume. This new test is recommended as a supplement to present U. S. official grain standards, as it is believed to be significant in testing of wheat as well as of flour.

THE TAX VETO—Individual disappointment at the failure of Congress to accomplish reduction in income taxes is undoubtedly great. Those seeking to defend the Presidential veto are probably right in saying that in the long run federal taxes probably can be cut more by being cut less immediately. That is, of course, small comfort when one is drawing one's remittance to the Collector of Internal Revenue. In the long run it can be a comfort only if Congressmen and the President are persuaded that casual disbursement of billions is no longer to be tolerated by the voters generally. Those who feel this way can well emphasize their sentiments to members of Congress while they are home during the summer recess.

TARIFF APPEALS — U. S. Tariff Commission recognizes that industry may wish to appeal under the escape clause of trade agreements. It has set up a complete procedure for such actions by an Executive Order of the President. Any American industry or enterprise injured or seriously threatened by imports under trade agreements can seek protection under these rules.

WAX RECOVERY—Recovery of potentially valuable sugarcane wax has long been sought in order to afford a new byproduct of the cane sugar business. But difficulty came from the fact that only two or three pounds of wax coat each ton of cane, making direct recovery by any physical or chemical methods too expensive to be practical. Extended studies of the Sugar Cane Station of the Bureau of Agricultural and Industrial Chemistry have disclosed, however, that the crude wax tends to accumulate in the waste press cake from filtration after clarification of cane juices. Solvent extraction at that stage was found practical. It is hoped that this may result in a valuable byproduct possibility for southern cane operators.

MORE BUREAUCRACY — Probably most food technologists feel, and correctly, that the new labor law passed by Congress over Presidential veto is a help to industry. Apparently many have, however, overlooked the fact that the government is just as much, perhaps a little more, a party to future handling of labor controversies. Certainly bureaucracy will be a party at the conference table, with a great deal of authority and still more influence. Consequently, the character

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DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

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of the individuals chosen to apply the federal labor law will now be more important than ever before. Congress itself recognized this in naming a "watch-dog" committee to supervise during the coming recess of Congress the way in which the Executive administers the law. Even the best officials will undoubtedly bear watching.

FEWER BUT LARGER — Federal Trade Commission continues its study of bigness in business. This summer it has reported to Congress on "Growth and Concentration in the Flour Milling Industry," largely a resume of present industrial distribution in this industry. The Commission emphasizes that concentration in flour milling is not as great as in a number of other important industries. But it points out that the six largest companies represent over a quarter of the business, and the next 30 organizations in size are nearly a quarter more. Thus the big 36 have a trifle over 50 percent of present milling capacity. It is also emphasized that there remain relatively few small mills. From 1909 to 1946 there has been a seven-fold increase in the number of inhabitants served per flour mill in existence. The report implies, but does not say, that bigness is a questionable advantage to the public, a typical New Deal conclusion.

SEASONAL FACTORS — No longer does the farmer have long idle seasons. His annual work curve has been made relatively flat by mechanization of most farm operations. This means that a limited number of men can produce much larger crops, not only because machinery widens their activities, but it also eliminates high peaks which used to set a top for production in many farm areas. Food technologists can well consider whether they may not be able in some cases similarly to spread the work by eliminating certain factors which increase the seasonal peaks in food processing. It is one of the most effective ways for lowering costs.

REDUCING WASTE—Extended use of DDT on crops has introduced occasional complications when byproducts of food are used for feeding. When byproduct feeds containing DDT are eaten, the insecticide tends to concentrate in the milk of cattle and to accumulate in the animal fat of the bodies. Government officials are, therefore, recommending precautions in use of this insecticide where leaves, stalks, and husks are to be fed to livestock. Furthermore, repeated use year after year in the same fields may cause accumulations injurious to crops, especially tomatoes, cucumbers, and squashes. It's the old story; too much of a good thing is bad. Processors of farm products must become missionaries with their suppliers to be sure that DDT is not abused.

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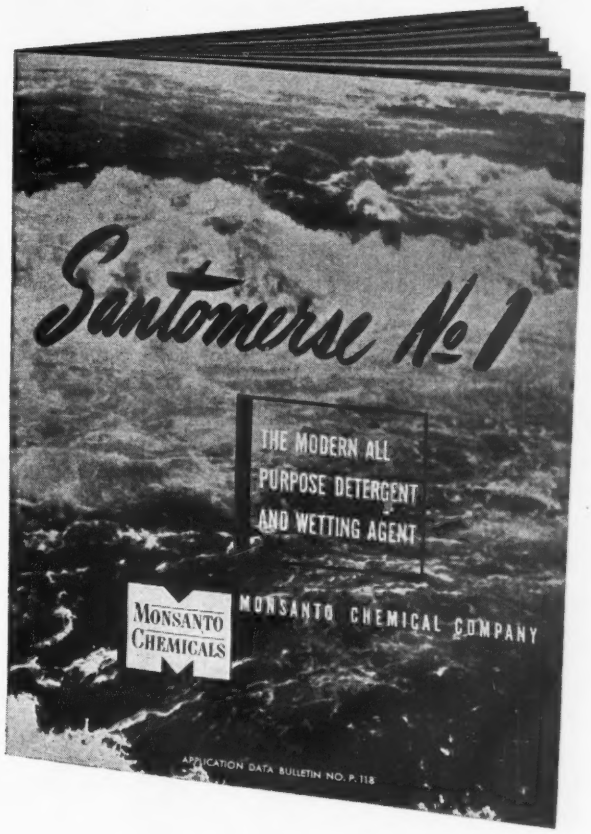
completely new book describing Santomerse No. 1

The modern, all-purpose detergent and wetting agent in bead and flake form


Santomerse No. 1
THE MODERN ALL PURPOSE DETERGENT AND WETTING AGENT
MONSANTO CHEMICALS
MONSANTO CHEMICAL COMPANY
APPLICATION DATA BULLETIN NO. P-118

Present and prospective users of synthetic detergents will find considerable information of value in this comprehensive bulletin now available. Copies will be sent on request.

Santomerse No. 1 is truly the modern all-purpose synthetic organic detergent and wetting agent. It possesses in unique combination the following valuable properties: wetting out, dispersing, emulsifying, penetrating and cleaning action. It does not have the limitation suffered by soap since it functions satisfactorily in hard or soft water or in acid or alkaline solutions. Although practically neutral in itself, it can be used effectively at a pH of 1 or 12, and is efficient in water varying in hardness from 0 to 1,500 ppm.

Santomerse No. 1 is an alkyl aryl sulfonate. It is manufactured in dry form of uniform quality, is free flowing and can be easily blended with other materials. It is readily soluble in cold or warm, soft or hard water.

Greatly expanded plant capacity will presently make Santomerse No. 1 available in increased quantities, in flake and spray-dried bead form. The bead form has low bulk density and is particularly suited to packaging for household use. The flake form has numerous commercial and industrial applications.

Send for your copy of this new Application Data Bulletin No. P-118. Also request copies for others in your organization who may be interested in getting complete data on this modern, all-purpose detergent and wetting agent. Contact the nearest Monsanto District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri. District Sales Offices: New York, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Limited, Montreal.

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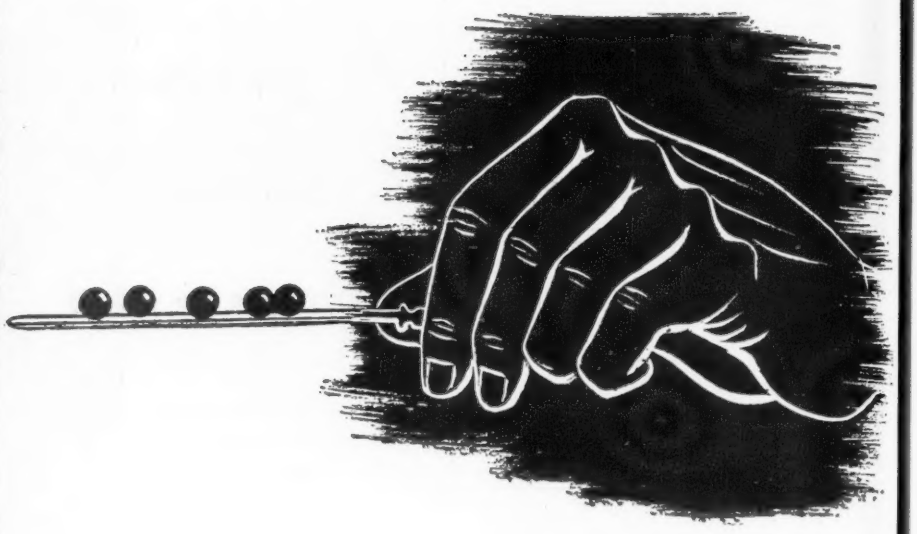
MONSANTO CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

it takes balance



Whether it's peas on a knife . . . or the emulsifier you choose for your needs . . . it takes balance!

Your emulsifier must be scientifically balanced to do precisely what you require. This is the basis upon which The Emulsol Corporation built its research in developing such outstanding products as:

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And most keenly balanced of all . . . The Emulsol Corporation's recognized "know-how" technical services. Send us your problem on your letterhead and, at no obligation, we will give you the most effective answer.

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MEN • JOBS • COMPANIES

JOHN H. REDDY

Formerly vice-president of Lovell & Covel Co., Boston, John H. Reddy has been elected president. He succeeds C. Norman Lovell, who has resigned after 40 years in the presidency.

DR. C. OLIN BALL

Director of the process and product research division of Owens-Illinois Glass Co., Dr. C. Olin Ball is resigning to establish his own business as a consulting food technologist.

INDUSTRY

Atlantic Coast Fisheries Co., Boston, has stated that its frozen rosefish pack for this year will reach 3,500,000 lb.

Canadian Sugar Factories, Ltd., has begun construction of a $4,000,000 sugar refinery at Taber, Alberta, according to T. G. Wood, manager of the company which has headquarters at Raymond, Alberta.

Corn Products Refining Co. has announced the election of Dr. Ernest W. Reid, vice-president in charge of the chemical division, as a director of the company.

Cudahy Packing Co., Chicago, has purchased the Phoenix, Ariz., plant of Tovrea Packing Co. The plant covers 20 to 25 acres, and processes fresh and cured meats, sausages, lards and shortening. It is believed that all former Tovrea company employees will be retained.

Curtiss Candy Co., Chicago, has announced plans for a new $2,250,000 candy and food products factory in Dallas, Tex. Scheduled to be in production by the spring of 1948, the new unit will handle all Curtiss products for the Southwest. The four plants presently in operation in Dallas will be consolidated in the new plant, increasing production capacity in Texas eight times.

•

Fairmont Foods Company is now the official name of the former Fairmont Creamery Co., Omaha, Neb.

R. T. French Co. has disclosed plans for a new $522,000 factory warehouse at the Rochester, N. Y., plant. It will be two stories high and will provide about 40,000 square feet of floor space.

General Brewing Corp., San Francisco, has announced that it will build a $3,000,000 brewing plant on a 35-acre site in Azusa, Calif.

Geo. A. Hormel & Co., Austin, Minn., has added gelatin making to its list of manufactures. The new Hormel product is expected to be sold to the gelatin dessert industry, the ice cream and sherbet industry, to confectioners and photographic film manufacturers. W. I. Gorfinkle is manager of the department.

Huyler's, Long Island City, N. Y., has acquired the H. L. Hildreth Co. and the Phoebe Phelps Caramel Co., both of Boston. The Hildreth Company, established in 1875, makes Velvet molasses kisses. The Phoebe Phelps organization manufactures butterscotch and taffy.

International Minerals and Chemical Corp., Chicago, has leased the Holland, Mich., plant of the Doughnut Corporation of America and will continue to make wheat gluten, wheat sugar, wheat sirup and wheat molasses. Leasing of the property will allow the company to meet its market demands until the new San Jose, Calif., plant is in full production.

Kraft Foods Co. is erecting a $150,000 cheese processing plant in Tylerville, N. Y.

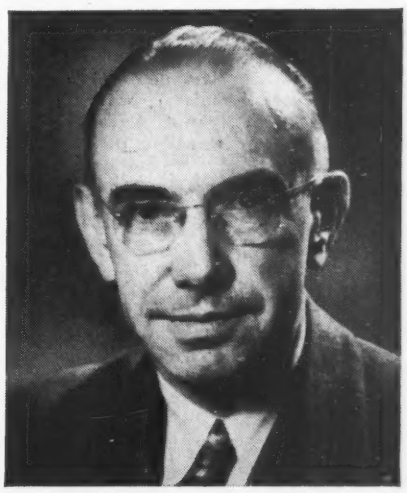
National Cherry Institute has been organized and will launch a sales promotion campaign to raise the per capita consumption of cherries from 1½ to 3 lb.

Swift & Co., Chicago, has appointed T. G. Redman as assistant comptroller. He has been with the company for 27 years.

Vacu-Dry Co. is completing an extensive expansion of its facilities and plant at Selah, Wash. Capacity has been tripled to meet the demand by bakers, institutions and food manu-

GLENN DICKSON

The newly organized Association of Food Industry Sanitarians has elected Glenn Dickson of the California Packing Corp. as president. Organization's purpose is to maintain and improve the high sanitary standards of the canning, freezing, dehydrating and other food processing industries.

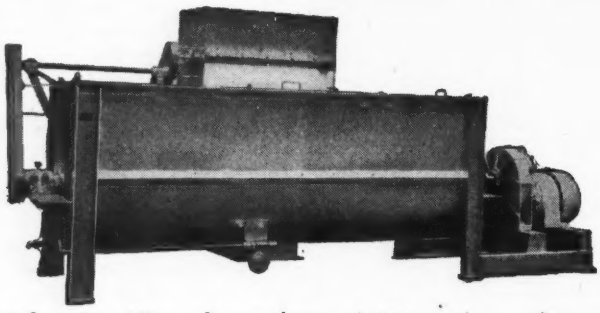


DR. HOWARD D. LIGHTBODY

Having served as chief of the biochemical division, Western Regional Laboratory, Albany, Calif., Dr. Howard D. Lightbody is now chief of the food research and development division, Quartermaster Food and Container Institute, Chicago. He succeeds Col. Donald L. Deane.

ROBINSON
PROCESSING EQUIPMENT

MIXER . . . with Brush Sifter!



Capacities from 1 to 234 cu. ft. per charge. Agitator make-up relieves end-load strain on outboard roller bearings. Inlet and discharge gates centrally located. Flush-fitted or sealed covers. Packing glands conveniently situated on Mixer body. Designed by experienced engineers and built to specifications. Robinson Equipment is available for all processing requirements . . . mixing, grinding, sifting, crushing, blending, etc. Inquiries invited!

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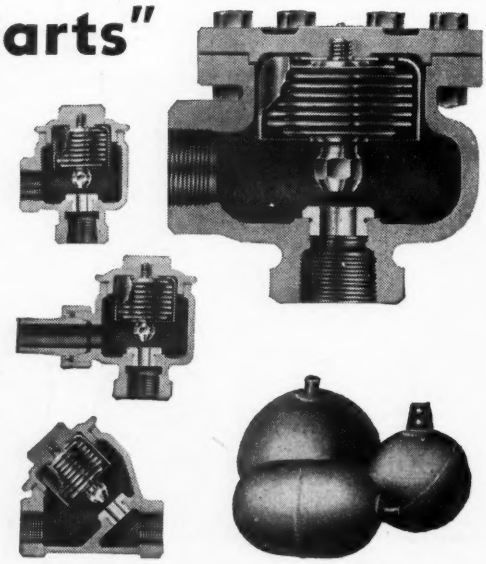
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

More Maintenance Men Learning Answer to

"CUT YOUR INVENTORY of Spare Parts"

In maintenance departments the present universal "cut your inventory" order spells standardization. 4 reasons why an increasing percentage of plants are cutting spare parts stocks by standardizing on Nicholson steam traps: unequalled fast action; ease of repair; completeness of line; top-flight source of technical information on specification and maintenance problems.



5 TYPES for Every Purpose

Sizes 1/4" to 2"; pressures to 225 lbs. Low cost. Designed for severe service.

Trap Catalog 444

W. H. NICHOLSON & CO.
193 OREGON ST., WILKES-BARRE, PA.
Valves • Traps • Steam Specialties

Nicholson is one of America's largest makers of welded floats for operating mechanisms and as H. P. storage vessels. All sizes and shapes. Bulletin 746.

JAMES R. KEENAN
Following the death of Horace Armstrong, James R. Keenan was elected president of the Reid Murdoch Division of Consolidated Grocers Corp., Chicago.

facturers for the company's Apple Pie Nuggets and Apple Sauce Nuggets.

Western Whaling Corp. has been incorporated under the British Columbia Companies Act with $500,000 authorized capitalization.

B. H. Wilson Fisheries, Ltd., has begun operations at its new sardine canning plant in North Head, N. B.

PERSONNEL

Lowell Armstrong, formerly assistant production manager for Ballard & Ballard Co., Louisville, Ky., has been appointed production manager, succeeding Rogers Morton, who is now general manager.

William A. Bowen has been appointed head of the frozen foods division of the John G. Paton Co., Inc., New York. He previously was national sales manager of the Birds Eye Division of General Foods Corp.

Robert L. Benjamin, recently resigned vice-president of American Home Foods, Inc., has been elected president of Homart Foods, Inc., Chicago, a new food manufacturing organization that will produce a line of specialty food products.

Richard J. Cody has joined the staff of Container Laboratories, Inc., Chicago. He formerly was sales manager for the carton plant of Container Corp. of America, Boston.

L. A. Dreyfus, Raritan, N. J., has received authorization from the Facilities Review Committee of the Office of the Housing Expediter to complete a chicle factory at an estimated cost of $420,000. Total cost of the project, including three previous

Mack has a different angle

Mack connecting rods are different. They're split at a 35-degree angle instead of the usual horizontal split. This means they can accommodate crankpins of exceptional size . . . yet are easily removable through the cylinder bore.

What's more, this construction gives them unsurpassed strength and stiffness . . . concentrated at the point where greatest stress occurs.

That's because the full-trussed cap is retained by cap screws threaded directly into the rod itself in place of the customary bolt connection. Thus, increased stiffness of the yoke is obtained by eliminating the counter bore necessary for the usual bolt-head.

In addition, perfect bearing fit and far greater accuracy and security of the cap fastening is assured because the cap is locked immovably in position by tongue and groove joints on both faces.

It's differences like this that add up to the big difference between Macks and other trucks. More work goes into Macks — and more thinking, too — so that you can get more work out of them.

Mack

since 1900, America's hardest-working truck

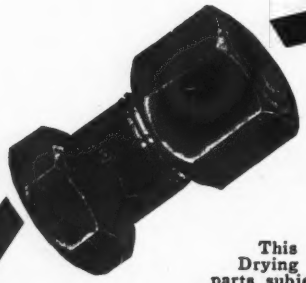
Mack Trucks, Inc., Empire State Building, New York 1, New York.
Factories at Allentown, Pa.; Plainfield, N. J.;
New Brunswick, N. J.; Long Island City, N. Y. Factory
branches and dealers in all principal cities for service
and parts. In Canada, Mack Trucks of Canada, Ltd.

Trucks for every purpose

"Transportation of frozen foods demands **dependability** and freedom from road failures, which we are happy to say we get from our Macks." So writes **Refrigerated Transport Co., Atlanta, Ga.,** whose ten Mack tractors maintain fast schedules throughout the Southern states.

5142-2

SPRAY DRYING?

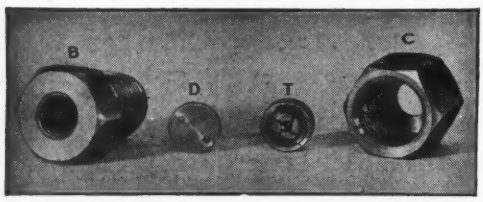


Have you tried Monarch H-466 *Carboloy Cemented Carbide* nozzles?

This nozzle is specially designed for Spray Drying work, and for extra long life, the parts subject to wear or erosion are made of Carboloy Cemented Carbide. Other parts are made of 18-8 stainless steel to resist corrosion.

Plants powdering milk, eggs, coffee, molasses, etc., report nozzle life of 50 to 100 times that of nozzles of ordinary materials. Think of the savings resulting from the elimination of "down" time alone!

Write for Catalog 6-A

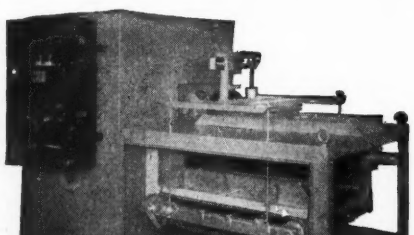


MONARCH MFG. WORKS, INC.

3307 Salmon St. Philadelphia 34, Pa.

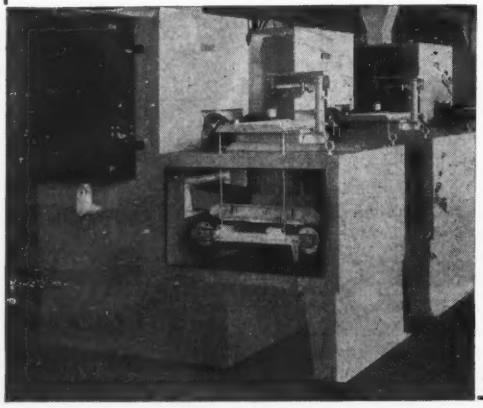
SYNTRON

"Weight Flow"



WEIGHING FEEDERS

Eliminate Guesswork



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ACCURATE CONTROL
in the
CONTINUOUS FEEDING
of BULK MATERIALS
at a CONSTANT WEIGHT

Smooth out those "Surges" in your Production Chart.

Write us about your problem—our Engineering Department will be glad to give you their recommendations.

SYNTRON CO.

460 Lexington Homer City, Pa.

WILLIAM T. SCANLON
Manager of the Louisville, Ky., plant of Carr-Consolidated Biscuit Co. since 1944. William T. Scanlon has been transferred to the managership of the company's Greenwood, S. C., bakery.

authorizations, is estimated at $1,361,360.

Thomas R. Reid, vice-president in charge of human relations for McCormick & Co., Inc., Baltimore, has departed for Geneva, Switzerland, to attend the International Labor Conference as an adviser to the employer delegate.

DEATHS

Charles F. Burns, 74, founder and president of Alton Canning Co., Alton, N. Y., May 2.

Prof. Forrest C. Button, professor of dairy manufacture at Rutgers University, New Brunswick, N. J., recently.

Thomas J. Carroll, 79, chairman of the board, Gorton-Pew Fisheries Co., Gloucester, Mass., recently.

Frederic W. Clifford, 79, one of the founders of the Cream of Wheat Corp., Minneapolis, recently.

Lew W. Fluharty, 62, University of California agricultural specialist, Oakland, May 13.

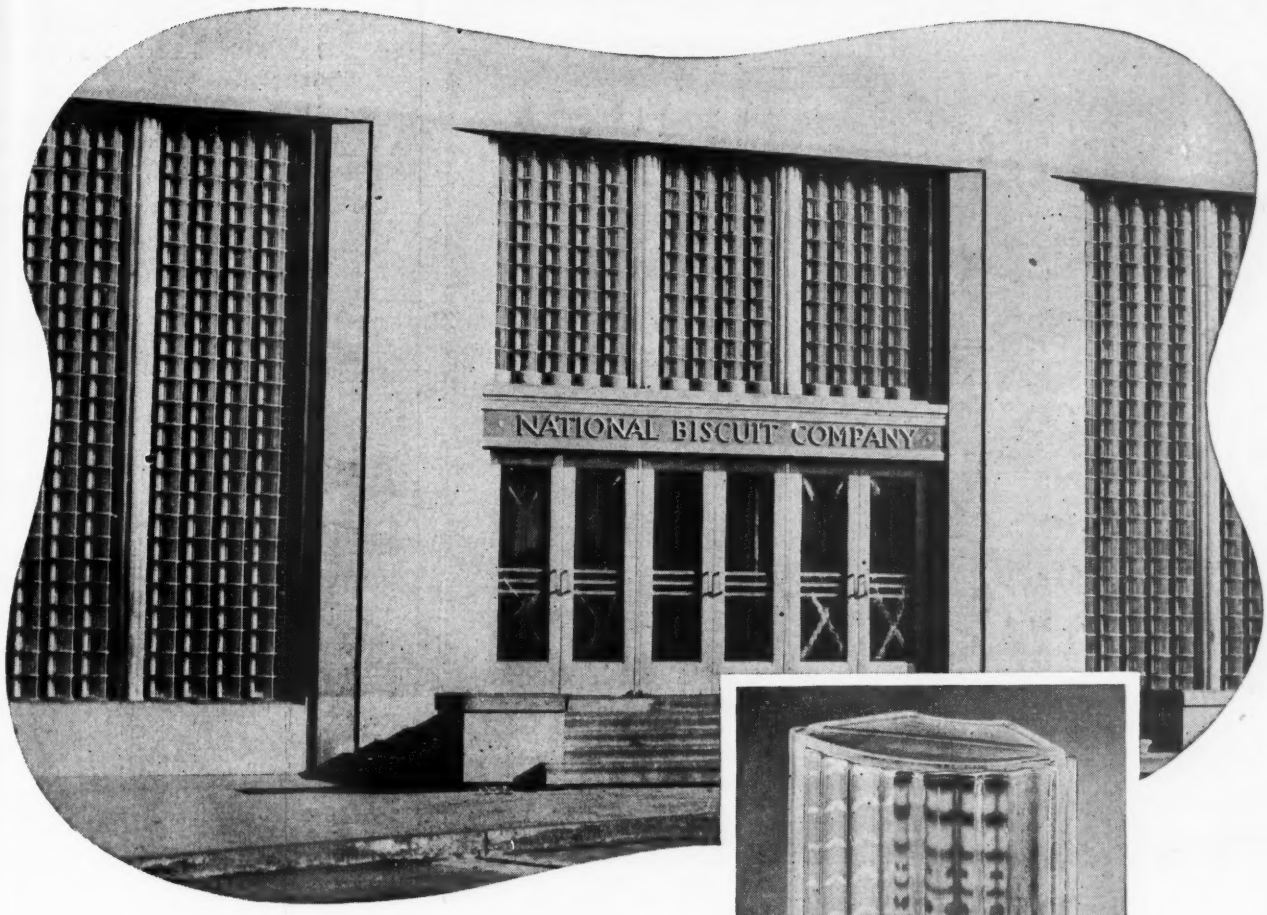
Edward R. Hanner, 79, director of the Danish Creamery Assoc., Fresno, Calif., recently.

Emil Matz, 45, manager of A. & M. Recompressing Co., Wapato, Wash., recently.

William C. Mander, flour milling engineer, Allis-Chalmers Mfg. Co., Milwaukee, May 29.

Andrew J. Millican, 61, owner of Superior Biscuit Co., in Seattle, recently.

THE MARK OF A MODERN FOOD PLANT



It's not surprising that PC Glass Blocks should be regarded by many people today as the mark of a modern building. These blocks are so modern themselves, in both appearance and function, that any building which includes them just naturally seems modern, too.

PC Glass Blocks are widely used in modern food plants largely for one reason: they do so many things so well.

They add to the appearance of any food plant . . . because they form bright, neat, translucent panels very appealing to the eye.

They transmit daylight generously into plant interiors, and can even direct the daylight to where it is most needed.

Their excellent insulating properties mean greatly reduced heat loss through light areas, and consequent savings in heating and air-conditioning costs. They prevent infiltration of dust and dirt, deaden outside sound, clean easily. They can be combined with transparent glass sash construction. And they harmonize perfectly with any architectural style.

When you are considering new construction or modernizing old buildings, you can use PC Glass Blocks with confidence. They're the mark of a modern building. We invite you to send the coupon for complete information on PC Glass Blocks. Pittsburgh Corning Corporation also makes PC Foamglas Insulation.

PC GLASS BLOCKS

Pittsburgh Corning Corporation
Room 659, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send along my free copy of your new book on the use of PC Glass Blocks for Industrial Buildings. It is understood that I incur no obligation.

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For A Reliable Source of
NATURAL and SYNTHETIC
FLAVORS
SEASONING OILS
and
FLAVOR RAW MATERIALS
"A Flavor for Every Purpose"
Consult:
FRITZSCHE
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BRANCH OFFICES and *STOCKS: Atlanta, Ga., *Boston, Mass., *Chicago, Ill., Cincinnati, O., Cleveland, O., Dallas, Tex., Detroit, Mich., *Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., *St. Louis, Mo., *Toronto, Canada and *Mexico, D. F.
FACTORIES: Clifton, N. J. and Seillans (Var), France.

J. Marshall McAhern, 38, engineer for the Harvard Brewing Co., Lowell, Mass., May 30.

Walter S. Parker, 46, manager of Swift & Co.'s St. Joseph, Mo., plant, recently.

W. L. Ramsey, 75, retired president of Santa Paula Walnut Assoc., recently.

W. C. Turner, managing director of Oceanic Sales, Ltd., Vancouver, B. C., recently.

A. T. Williams, 61, vice-president and sales manager of French Sardine Co., and a director of High Seas Tuna Packing Co., recently at Long Beach, Calif.

ASSOCIATED INDUSTRIES

Allis-Chalmers Manufacturing Co. has made known the appointments of William A. Roberts and William C. Johnson as executive vice-presidents, respectively, of the tractor and general machinery divisions. At the same time, Marshal L. Noel was made vice-president and general sales manager for the tractor division and J. L. Singleton is now vice-president and director of sales for the general machinery division.

American Car and Foundry Co. has elected Rudolph Furrer vice-president in charge of engineering for the company. Mr. Furrer is internationally known as a research and development engineer, having served on the War Metallurgy Committee and as a special consultant in ordnance research and development.

Food Machinery Corp. has appointed J. F. Jodis manager of its Texas Div., succeeding the late Elbert H. Crockett.

The Hinde & Dauch Paper Co., Sandusky, Ohio, has announced purchase of a 22-acre site at Chatham, Ontario, for construction of a $1,000,000 box factory. The new plant will be owned and operated by The Hinde & Dauch Paper Co. of Canada, subsidiary of the U. S. firm.

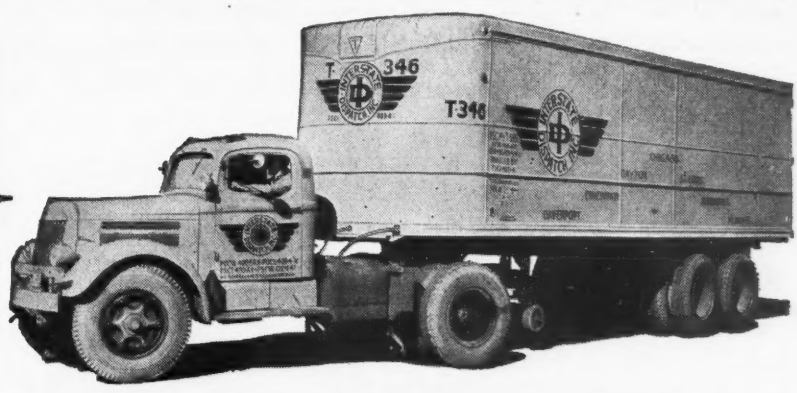
Link-Belt Co., Chicago, has announced the appointment of Robert C. Becherer to the position of plant manager of the Ewart plant in Indianapolis. The plant makes the company's conveyor and drive chains.

Monsanto Chemical Co. has elected Dr. Charles A. Thomas, former vice-president and technical director, as executive vice-president. Felix N. Williams, vice-president and general manager of the company's plastics division, was elected to the board of directors.

Consolidated Forwarding Co. Inc., St. Louis, Missouri. Starting with one wagon in 1884, I. M. Schiebe, President, has built up a highly successful business operating 173 power units between St. Louis and other large midwestern cities. They have found Trailmobiles operate at less cost because they are more durable, pull easier, and require less maintenance.

V. E. Green, Norfolk, Virginia. This is an established, highly-regarded concern that hauls large quantities of quality seafood, fruit and produce to most southern cities. Mr. V. E. Green, the owner, states that "Trailmobile's remarkable ease-of-pull, improved construction, and cooperative service mean more satisfactory trailer performance at lower cost of operation."

Interstate Dispatch Co. Inc., Chicago, Illinois. This progressive company provides direct service between Chicago, Cincinnati, Dayton, St. Louis and other cities. They have discovered that the new Trailmobile tandem saves considerable tire expense, thus reducing operating cost. They are also pleased with Trailmobile's efficient and cooperative Branch Service.



For Lower Operating Cost

The Trend is to TRAILMOBILE

Because Trailmobile offers top performance at minimum operating cost, trailer users coast-to-coast are joining the growing throng of enthusiastic Trailmobile owners.

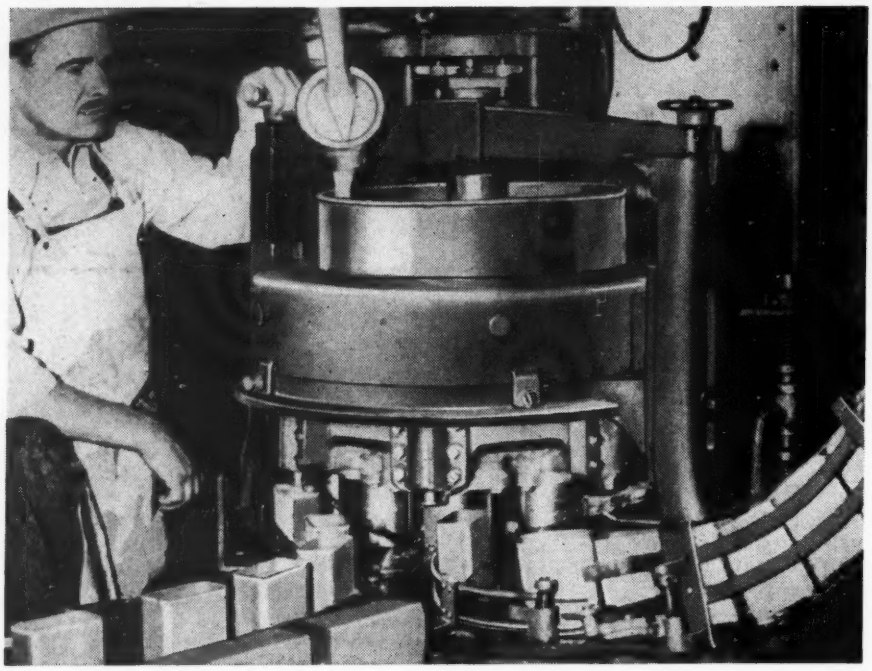
Why do Trailmobiles cost less to run? There are a lot of reasons! Among the most important is the advanced Trailmobile design—including "diamond" sides and a load-distributing understructure—that cuts weight, adds to strength and durability, reduces maintenance, and permits bigger payloads. And Trailmobile's undercarriage—the "easiest-pulling in the Industry"—cuts fuel bills to the bone!

No wonder these Trailmobile profit-advantages . . . plus many other Trailmobile improvements . . . plus 73 friendly Trailmobile Customer Service Centers . . . are making Trailmobile salesmen of thousands of trailer operators the nation over.

Visit your nearest Trailmobile Branch today. Find out all about Trailmobile's low operating cost and all the other reasons why the TREND IS TO TRAILMOBILE!

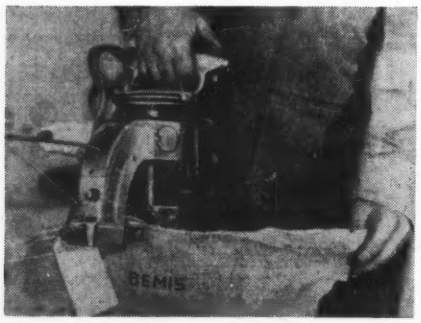
THE TRAILMOBILE COMPANY—CINCINNATI 9, OHIO

FOOD EQUIPMENT NEWS



High-speed Filling of Frozen Food Containers 1

A HIGH-SPEED, accurate, rotary filling machine for standard size, semi-rigid frozen food containers with metal ends has been introduced by Food Machinery Corp., Dept. I, Hoopeston, Ill. The machine, a specially adapted 6-pocket plunger filler can handle up to 180 or more cartons per min., employing a special filling feature called "No - Can - No - Fill" which prevents product waste. It receives and discharges cartons in a single line. A special container feed automatically conducts the cartons onto a disk, whereby they enter the machine. A device which measures the amount of fill is accurate, simple and easily adjustable to a desired variation providing each carton with equal fill. Optional, extra equipment such as supplementary mixing or heating chambers, stirrers or other attachments can be provided to handle viscous or semi-solid materials.



Sews 100 Bags Per Hour 2

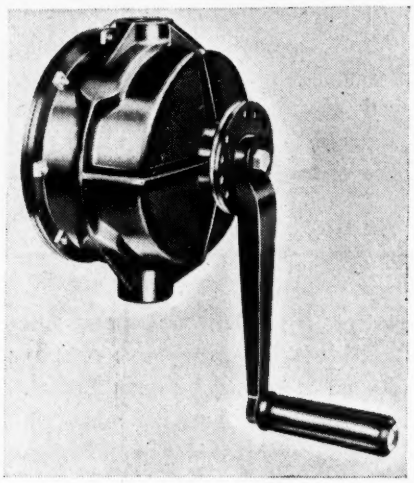
A NEW hand electric bag closer that weighs less than 11 lb., including full cone of thread, and will close about 100 bags per hr. with tight, uniform stitches is distributed by Bemis Bag Co., Dept. I, St. Louis, Mo. It operates from any 110 volt, a.c. or d.c. line and is ideally suited for closing cotton, burlap or paper bags. A conveniently located switch on the handle makes starting and stopping possible with a flick of the thumb.

Platform Utility Truck 3

A NEW gasoline engine operated platform utility truck, with a platform 36 x 66 in., 72 in. wheel base and overall length of 108 in., that turns within its own length, is announced by Truck-Man Inc., Dept. I, Jackson, Mich. The truck is equipped with 4, 14 x 4½-in., 6-ply pneumatic tires, has a 2-speed transmission and load capacity of 1,500 lb.

Frozen Food Wrap 4

A NEW overwrap for frozen foods, "Foilrap," which consists of a .00035 gage Alcoa aluminum foil bonded to a 30-lb. sulphite paper and dip-treated with a thermoplastic heat-sealed coating on both sides, has been developed by the Rapinwax Paper Co., Dept. I, Chicago, Ill. Sold commercially in rolls Foilrap covers the standard fruit and vegetable carton with adequate surplus to insure a tight, hermetic closure at a cost of ½¢ per wrap. Laboratory investigations indicate a decrease of 20 percent in freezing time, improved moisture-proof protection and decreased dehydration.

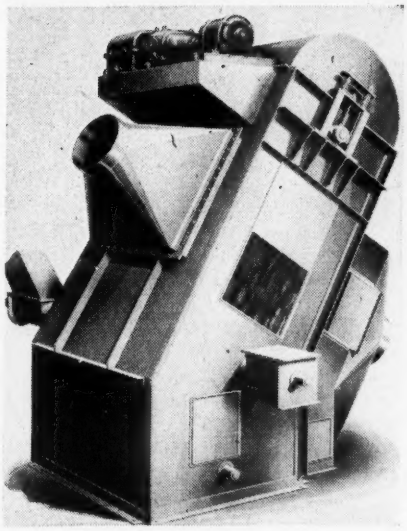


Hand Transfer Pump 5

A HAND transfer pump that will deliver 10 g.p.m. at normal cranking speed of 60 turns per min. and 15 gal. at 90 turns is made by Belco Industrial Equipment Division, Inc., Bogue Electric Co., Dept. I, 42 Iowa Ave., Paterson 3, N. J. Its rotor and shaft are supported on ball bearings which are sealed in grease and do not come in contact with the liquid being pumped. The plastic vanes are positively actuated and cannot bind or stick. Maintenance of prime is insured with an ingenious built-in check valve. The unit will handle a variety of liquids such as cider, sirup, insecticides, and water.

WRITE FOR MORE INFORMATION

Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials. Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.



Multi-Louver Drier 6

A NEW design of drier, which is especially recommended for materials requiring short treatment time and/or multiple drying temperatures, is announced by Link-Belt Co., Dept. I, 307 N. Michigan Ave., Chicago 1, Ill. The unit is extremely flexible, in that it is possible to dry, cool and process material. The moving element consists of two strands of roller chain with specially designed flights, suspended in such a way as to provide means for keeping the bed in a constantly flowing mass. The material flows in a shallow bed over the ascending flights and at the same time is gradually moved across the drier from the feed point to the discharge point. Gases from the furnace are pulled through the moving bed of material, heating it and causing evaporation of moisture. This results in uniform drying and a low temperature for the dried product. The entire area of the drier is covered by the suction from the exhaust fan, thus assuring practically dustless operation. The drier is not limited to one source of heat, as the air can be heated by steam coils or by a gas or oil furnace. Coal-fired furnaces can also be used. The same principle of heat exchange can be employed in this unit for cooling materials with the same high efficiency as when drying.

Plastile Floor Tile 7

A DECORATIVE floor tile with excellent sound absorption qualities is made by the U. S. Stoneware Co., Dept. I, Akron, O. It is available in a wide range of colors in standard tile sizes of 8½ x 8½ and 9 x 9 in. and in sheets 35 x 35 in. Plastile, as it is called, is composed of a 3/32 in. layer of genuine vinyl compound bonded to a 3/32 in. resilient base of synthetic impregnated cork. The maker claims it is not affected by acids, alkalies, oils, grease, abrasion or any type of cleaning fluids. It needs no waxing and is non-slippery even when wet. Moisture will not cause it to rot, nor will it crack or harden with age.

Shipping Container 8

AN insulated round container that will hold frozen food in transportation from 3 to 5 days without dry ice or mechanical refrigeration is made by Frigid Roller Container Corp., Dept. I, 845 S. Wabash Ave., Chicago 5, Ill. Resembling a large drum, with two hard rubber tires for easy rolling and turning, and a removable head, the container has a capacity of 12 cu. ft. Its overall dimensions are 36 in. high by 38 in. wide. A special cover, with cold plate attached, is furnished for cases where immediate removal of contents at destination is not possible or desirable.

Draft Gage 9

BACHARACH INDUSTRIAL INSTRUMENT Co., Dept. I, 7000 Bennett St., Pittsburgh 8, Pa., has introduced a new, all-purpose draft gage that can be used on every type of heating plant. It is supplied with 9 ft. of rubber tubing and a 5-in. metal sampling tube. It can be used for readings at the point of draft measurement or placed any distance away from the test point. Among design features is an exceptionally large area diaphragm enclosed in a metal housing, which assures sustained accuracy and trouble-free service. Other features include: A 3-in. wide scale which can be read accurately and easily even in dim light; zero adjustment can be made without removing any parts; self-contained and compact — dimensions 4¾x7½x3 in. deep.

Clamp Trucks 10

ONE-MAN clamp trucks, which supplement the work of power-lift trucks in helping to solve problems of in-plant delay in moving materials, are produced by Food Machinery Corp., Dept. I, Riverside, Calif. At the base of the truck are short, powerfully-tipped arms that squeeze with such strength they can lift a loaded box or boxes, weighing from 300 to 600 lb. The squeeze is applied by the operator as he steps on a pedal. Being able to maneuver in and out of small areas, the clamp truck can pick up and deliver loads while power-lift trucks are being used on more cumbersome jobs.

Frozen Pre-cooked Meal Heated in 75 Seconds 11

AN ELECTRONIC oven, which will heat a frozen pre-cooked dinner to the proper serving temperature in 75 sec., is announced by the General Electric Co., Dept. I, Syracuse, N. Y. The oven uses microwave radio energy and requires the same amount of power used for a domestic electric range. It looks like a small domestic refrigerator and has a small aluminum door near the top that opens into the oven. To operate, the pre-cooked frozen food is placed in the heating cavity and the oven door closed by treading on a bar near the bottom of the unit. The power goes on immediately, and later is turned off by the timer. When the power shuts off the door opens immediately and the meal is ready to serve. The unit is designed for restaurant or cafeteria use.

Westvaco
METHYL BROMIDE PROTECTS ALL FOOD PRODUCTS FROM PESTS

NO food product is safe from pests. *But* — no pest is safe from Westvaco Methyl Bromide!

Used bi-yearly and followed by "spot" fumigations, Westvaco Methyl Bromide will keep your plant practically infestation free!

Free Assistance on Request!

Write our Agricultural Chemicals Division to secure the valuable aid of our technicians. Let them plan your sanitation program, suggest desirable structural changes, and instruct your employees how dangerous infestation can be avoided.

In addition they will recommend a competent industrial fumigator who will apply Westvaco Methyl Bromide properly to kill every insect and rodent on your premises!

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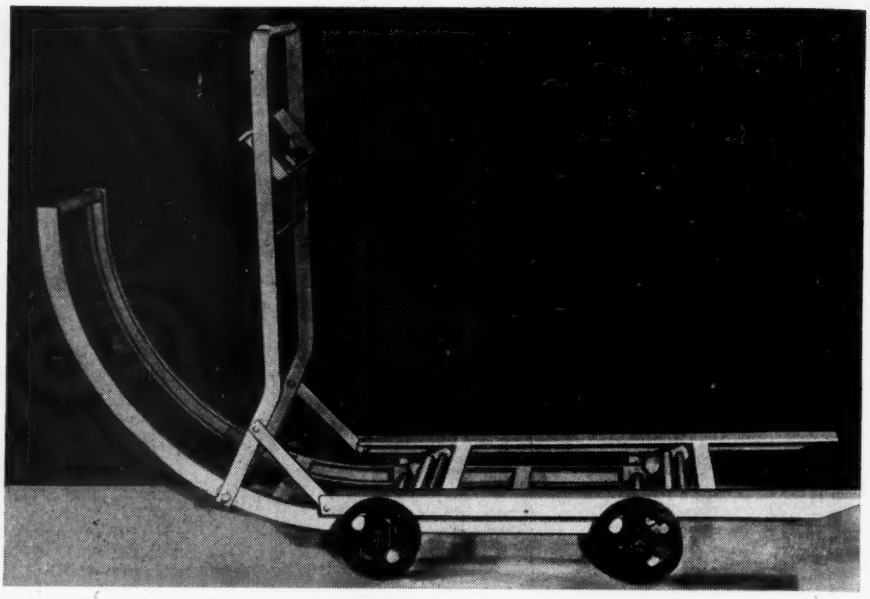
ST. LOUIS, MO.



Light Hand-lift Truck for Short Move Jobs 12

FOR handling short move jobs involving loads up to 1 ton in factories, warehouses and transfer depots, Arcade Mfg. Div., Rockwell Mfg. Co., Dept. I, Freeport, Ill., announces a new light hand-lift truck. With platform lowered it fits under a skid-box. A pull lifts load above wheels, and locks securely. Its overall length is 70 in. Platform area 11¾x43 in.

Milkstone Remover 13

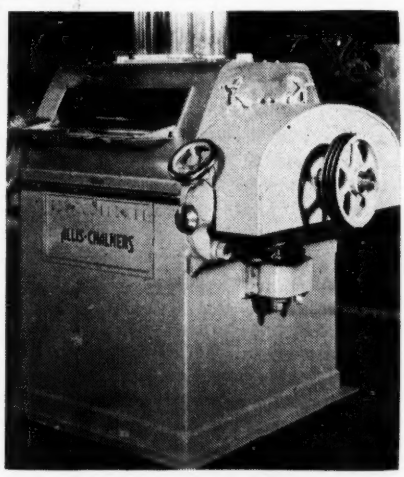
PENNCLEAN, a new product for the removal of milkstone from dairy utensils and dairy plant equipment, is being offered by the B-K Sales Div. of Pennsylvania Salt Mfg. Co., Dept. I, Philadelphia, Pa. It has a phosphoric acid base with the addition of a wetting agent and an inhibitor to prevent corrosion of metals. It may be used effectively for the removal of milkstone from dairy utensils; for the daily cleaning of high temperature dairy processing equipment such as flash pasteurizers; and for creamery, cheese and ice cream equipment.

Rubber-Covered Wrench 14

A NEW forged steel sanitary pipe wrench, covered with Neoprene to prevent denting, nicking, scratching or marring of valuable equipment, is made by the Haynes Mfg. Co., Dept. I, 709 Woodland Ave., Cleveland, Ohio. With the exception of the inside every part of the wrench is covered with tough, resilient Neoprene. Made in sizes to fit 1, 1½ and 2-in sanitary hexagon nuts.

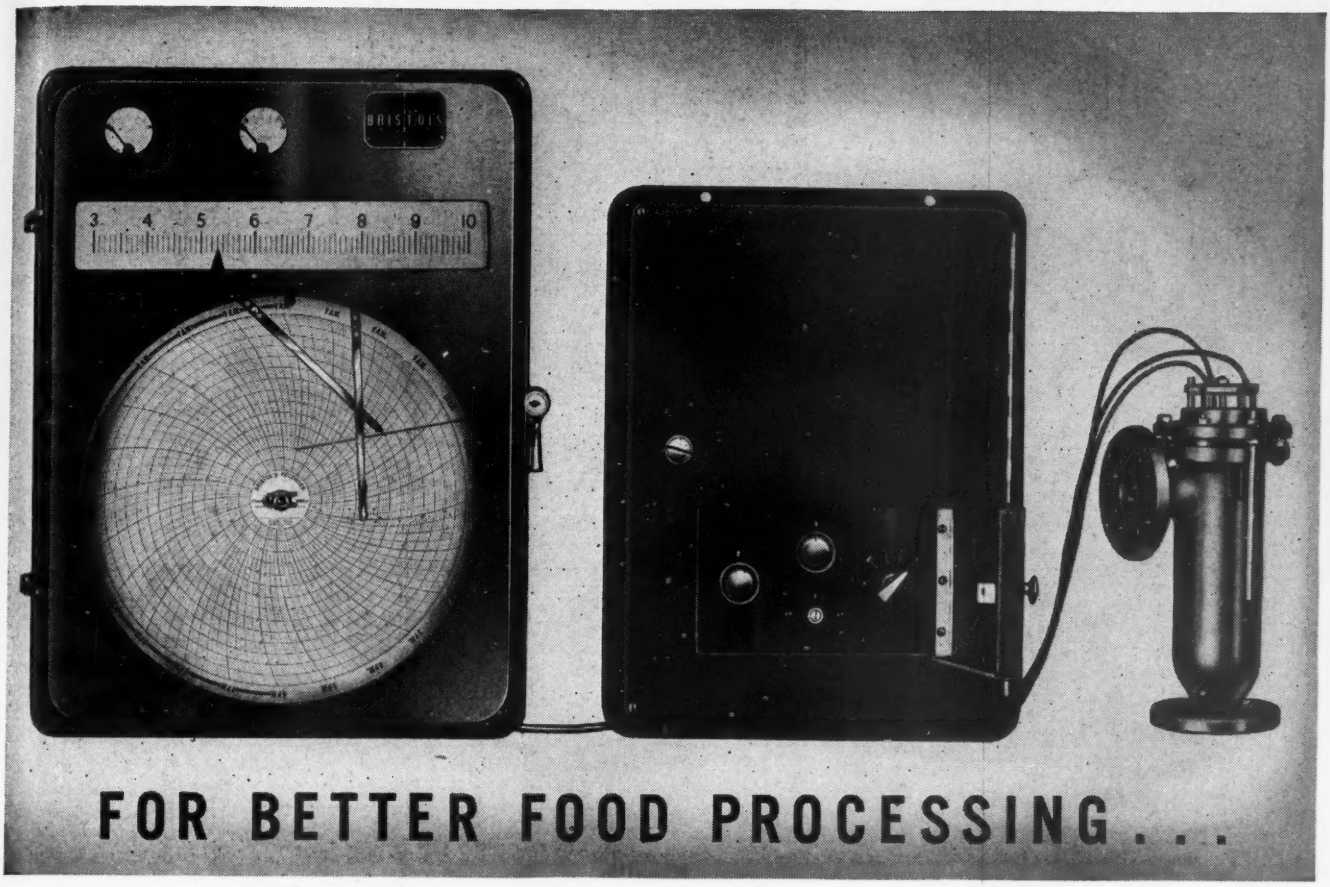
Canners' Grading Scale 15

DETECTO SCALES, INC., Dept. I, 1 Main St., Brooklyn 1, N. Y., announces the availability to canning companies of the Detecto Grading Scale, Model No. 47100. Overall height is 51 in. The bright, white dial face, which registers 100 lb., is well protected from juices by glass and plated sash. Also available in capacities up to 300 lb on order. The platform is 10½x14½ in.



Flour Mill Machinery 16

NEW designs of flour mill machinery based on a nation-wide survey of industry needs are announced by Allis-Chalmers, Dept. I, Milwaukee 1, Wis. Greater cleanliness will be obtainable as a result of smoother interior and exterior contours of the new machines. Possibilities of insect infestation and objectionable stock accumulation are reduced to a minimum. Use of new, light-weight metal alloys have reduced machine weight while increasing over-all strength. Newly designed units consist of: A streamlined roller mill with independent high-speed vibrating feeders for each pair of rolls and new rolls offering more uniform chill and better grinding characteristics; a sifter built around the well-known Nordyke sieve with new arrangement for taking suction off each section; and a new purifier in which hoppers replace the conventional conveyors.



FOR BETTER FOOD PROCESSING . . .

Watch pH!

If acid-alkaline conditions are critical factors in *your* plant — as they are in most food processing — you'll do well to contact Bristol. Bristol engineers can fit your system with instruments that give you a record and *100% automatic control* over pH.

Right now, in scores of food plants, Bristol pH control instruments are protecting the processing of citrus fruits . . . juice liming in sugar clarification . . . gelatin manufacture . . . carbonation and sulphitation in beet sugar refining . . . fresh water supplies for a large variety of processed foods and many other applications.

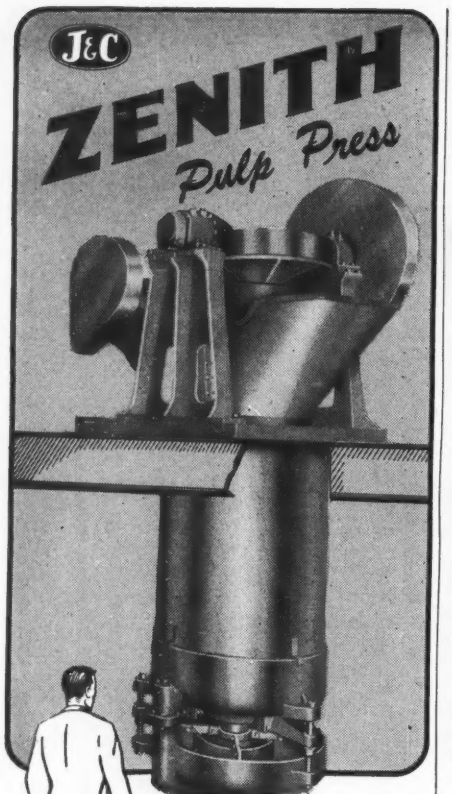
For better control over flavor, spoilage, and processing efficiency through pH control, write: THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 91, Conn. (The Bristol Co. of Canada Ltd., Toronto, Ontario, Bristol's Instrument Co. Ltd., London N. W. 10, England.)

OTHER BRISTOL INSTRUMENTS FOR FOOD PROCESSING:

Automatic Controllers and Recorders for Temperature • Pressure • Vacuum • Absolute Pressure • Flow of Fluids in Pipes • Liquid and Water Level • Humidity • Mechanical Motion and Operation • Telemetering Instruments • Tachometers and Control Valves

Engineers process control for better products and profits

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS



RECOVER
EXTRA PROFITS
... by Increasing
PRESSING EFFICIENCY

New uses for the Zenith Pulp Press are being discovered every day. Among the many installations for **DEWATERING** are: BEET PULP • PINEAPPLE • TOMATO POMACE • CORN GERM and FIBRE • VEGETABLES • BREWER'S GRAIN CHERRIES • CITRUS FRUITS • FISH • PAPER PULP RECLAIMED RUBBER • TANKAGE • etc.

100% continuous... from storage bin to pressed cake, the Zenith Pulp Press dewaters up to 26 tons of wet pulp per hour.

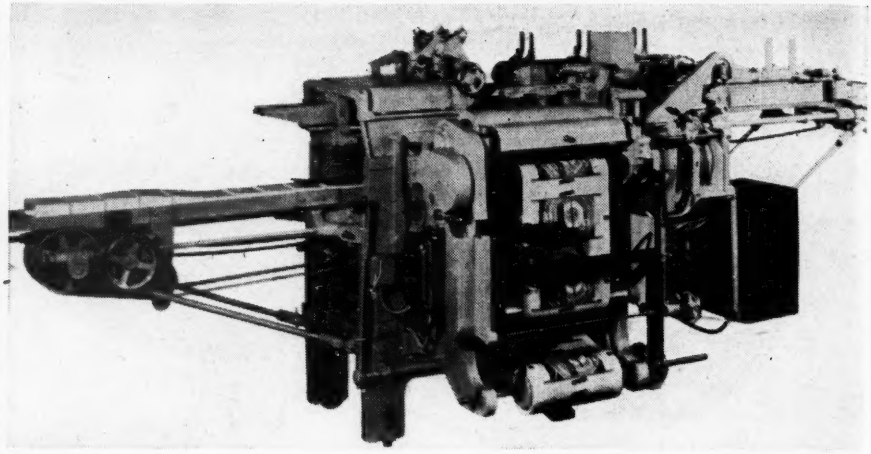
The material is fed mechanically to a tapered screw-type spindle that compresses and forces it through the press, discharging liquid through the central orifice and pressed cake to conveyor for disposal.

Constantly rolling pulp assures maximum dewatering. Heater resistors permit steam injection.

A Pilot Press is available for trial in your plant.

"Work Well Done Since '81"

A PRODUCT OF
Jackson & Church Co.
SAGINAW, MICHIGAN



Machine Wraps a Wide Range of Package Sizes 17

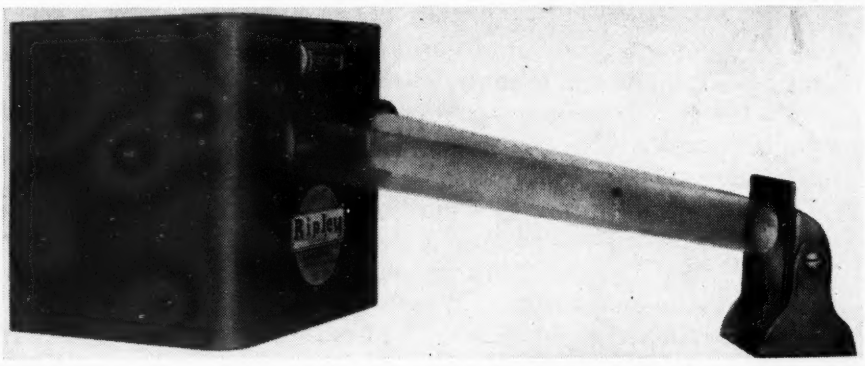
FOR packaging fresh or frozen foods, crackers, cookies and similar articles in irregular packages varying in length from 4 to 10 in., in widths from 3 to 5⅝ in., and in height from 1⅜ to 2¾ in., and for overwrapping with such self sealing papers as waxed sulphite, waxed glassine, Cellophane, self sealing foil and laminated papers, Battle Creek Bread Wrapping Machine Co., Dept. I, Battle Creek, Mich., announces the Model 46 wrapping machine. It can be adjusted to any package size within the above limitations in less than 10 min. Breathing folders, built into the machine, enable it to handle irregularities in the packages and still provide secure sealing. 60 to 80 packages may be wrapped per min., providing a secure seal and an accurate registration of printed overwrap.

Apple-coring Machine 18

A NEWLY designed apple corer is manufactured by Magnuson Engineers, Dept. I, San Jose, Calif. Operator places apples, stem end up, on a rubber cushion ring. As the machine revolves, an overhead cam forces a plunger down on the apple, pressing it onto a tubular coring knife which cuts out the core. The cored apple is swept from the cushion onto a conveyor and the core is discharged from the coring knife and collected on a divided section of the same conveyor.

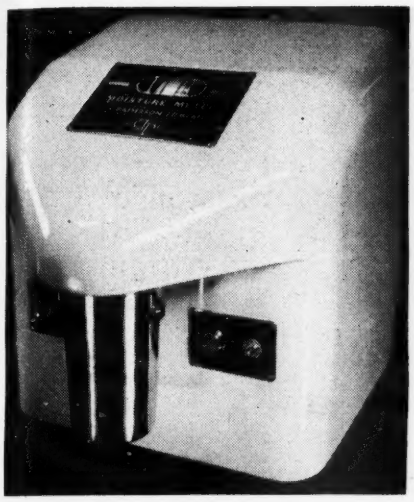
Reflective Coating 19

A NEWLY developed reflective roof coating that deflects 70 percent of the sun's rays and reduces interior temperatures in buildings as much as 15 deg. is available from United Gilsonite Laboratories, Dept. I, Scranton 1, Pa. Called Gilsalume, the gilsonite aluminum roof paint may be easily applied with either ordinary bristle brush or spray gun. One coat will provide effective protection against the summer sun, show, frost, rain and dampness.



Photoelectric Counter for Bottlers and Canners 20

A PHOTOELECTRIC COUNTER, designed to meet the need for a compact, easily installed, packaged unit in the bottling and canning industry, is announced by Ripley Co., Inc., Dept. I, Middletown, Conn. Light source, phototube and counter are built in one housing, thereby eliminating long leads and unnecessary wiring. The control operates on interruption of reflected light from a swivel-type, adjustable chrome reflector. Sensitivity adjustment can be easily reached through an aperture in the housing. The relay will carry a load of 3 amps. continuously for 8 million impulses. Minimum time for one cycle is .08 sec. or 700 cycles per min. Minimum duration of beam interrupting a 1-in. object is .02 sec. Minimum light intensity, 2 ft. candles.



Moisture Meter 21

A DIRECT reading electronic moisture meter that is automatic in action, is announced by the C. J. Paterson Co., Dept. I, Kansas City, Mo. It requires no calibration curves or charts; corrections for the temperature of the substance being measured are compensated automatically. Moisture percentages up to 85 to 90 percent can be measured, with accuracy comparable to the traditional oven-balance methods, in 15 sec. A further feature of this new instrument is its stability; large changes in the line voltage and room temperature do not effect its accuracy.

Axial-Air-Gap Motors 22

FAIRBANKS, MORSE & Co., Dept., I, 600 S. Michigan Ave., Chicago 5, Ill., have introduced an entirely new type electric motor which is less than half the size and weighs 30 percent less than conventional motors. Principles are revolutionary in that the magnetic lines of force follow a path parallel to the shaft as compared to a radial path taken by the magnetic flux in so-called conventional motors. It is suitable for horizontal or vertical flange mounting, or on an angle base for belt drive. Other unique features are: Improved appearance; simplicity and speed with which it can be inspected, cleaned and lubricated; a cooler rotor and greater acceptability as flange-mounted motor with less over-hang for unlimited machine application.

Features that reduce the danger of contamination can be *built into* your stainless steel processing vessels. These are: rounded corners – a finish sufficiently high for your application—sound welds, ground and polished flush with the parent metal surface—free from pits, holes and undercuts in which reagents can lodge.

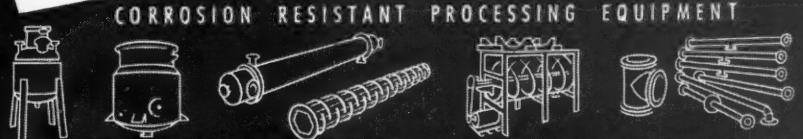
Because we work exclusively with stainless steel and alloys, S. Blickman, Inc. assures construction that reduces danger of contamination to a minimum. We have the tools and dies needed for proper round corner construction – special polishing machines that provide the exact finish for your application—experienced craftsmen particularly trained in the problems encountered in welding stainless steel and alloys. For processing equipment that reduces losses from contamination, consult with us.

S. BLICKMAN, Inc., 4108 GREGORY AVE., WEEHAWKEN, N. J.

S. BLICKMAN, INC.
Guards Alloys in Fabrication

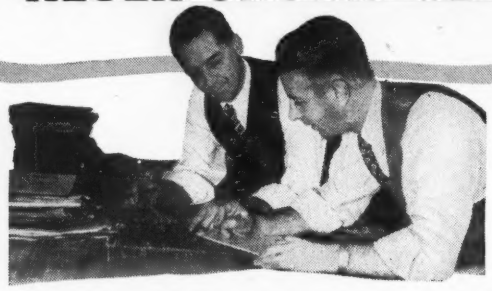
SEND FOR THIS VALUABLE BOOK
A request on your letterhead will bring our guide, "What to Look For When You Specify Stainless Steel for Your Processing Equipment."

CORROSION RESISTANT PROCESSING EQUIPMENT



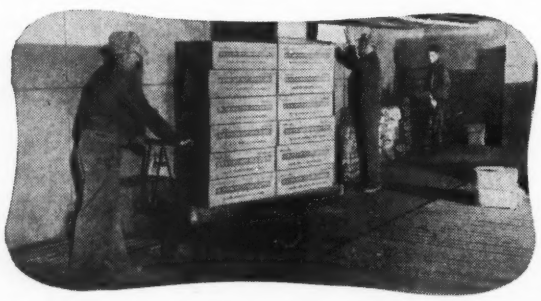
TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

The RIGHT INSULATION correctly applied NEVER GROWS OLD



Selecting the Right Insulation: Any insulation will save *some* money—but only the right insulation, correctly applied, will save the *most* money for the longest period of time. Because of its many advantages, leading refrigerating engineers have long relied on J-M Rock Cork Insulation for refrigeration service.

Correct Application: No insulation is better than the man who installs it. That's why every J-M Insulation Applicator is a skilled mechanic thoroughly trained in all phases of up-to-date application methods.

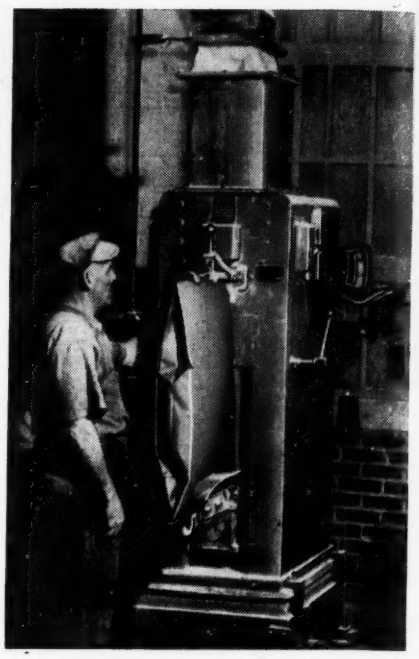


26 Years Young: J-M Rock Cork Insulation was used to insulate this 40′ x 60′ cold storage room of the Defiance Grocery Company, Defiance, Ohio, back in 1921. Because the job was *engineered right* and *applied right,* it is still providing dependable service.

If you would like to have a J-M Insulation Engineer help you with your next insulation job, write Johns-Manville, Box 290, New York 16, N. Y.

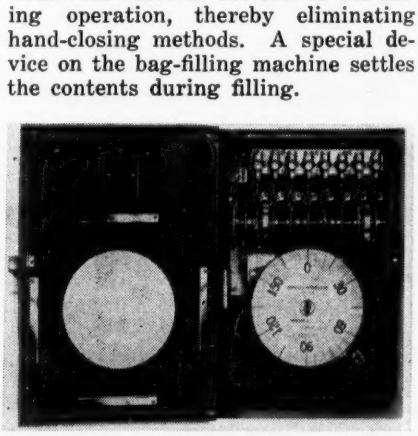
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville ROCK CORK



Bag Filling Machine 23

A LOW-COST machine for industrial packaging of dry chemical and food products in multiwall paper bags is made by the St. Regis Paper Co., Dept. I, New York, N. Y. The mechanized packaging operation, made possible by this packer and paper valve bags, eliminates the dusty operation formerly encountered in plants where fiber drums, wood or steel barrels, fabric or burlap bags were filled from a spout or chute. Valve bags are factory closed at both ends and a small opening or valve is left in one corner. It is through this valve that the bags are filled. The weight of contents automatically closes the valve at the end of the filling operation, thereby eliminating hand-closing methods. A special device on the bag-filling machine settles the contents during filling.



Time-Cycle Controller 24

A CONTROLLER that starts, times, correlates and stops multiple operations in any process which can be actuated by air pressure or electricity is announced by Seely Instrument Co., Inc., Dept. I, 323 Fourth St., Niagara Falls, N. Y. It provides unlimited flexibility of scheduling without use of tools and without changing any parts. Air control is integal and does not require the intermediary of solenoid valves. Pilot valve action is

For Maximum Efficiency in Process Control

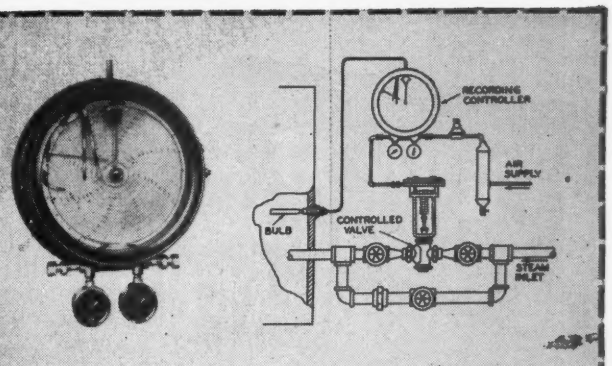
...3 BASIC TYPES OF CONTROLLERS

● Getting maximum efficiency in the automatic control of a cooking or heating process depends . . . first of all . . . on the selection of the *right* controller. The best controller you can buy is the one which gives the best type and degree of control for the particular job. *Too much* control is just as inefficient as *too little*.

There's a controller to give maximum efficiency on every type of food process. The Foxboro On-Off Controller is outstandingly successful in a majority of cases because it is *virtually free from throttling effect*. The economical Model 41 Indicating Controller, either On-Off or Proportional Action without reset . . . is an ideal selection for certain processes when records are not essential. Other Foxboro Controllers have been especially developed for *continuous* processes.

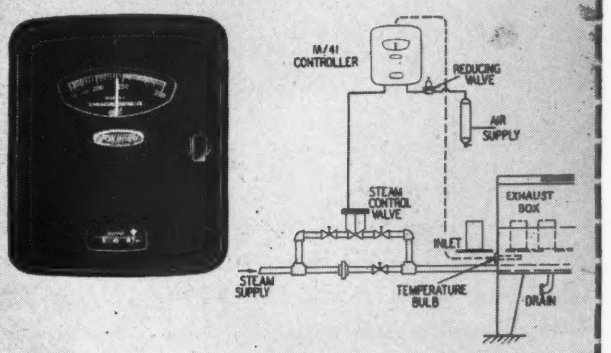
Let Foxboro help you select the best type of controller for your specific process . . . the most efficient and economical. Write, giving available details, to **The Foxboro Company, 30 Neponset Ave., Foxboro, Mass., U. S. A.**

A Canadian Product by The Foxboro Co., Ltd.



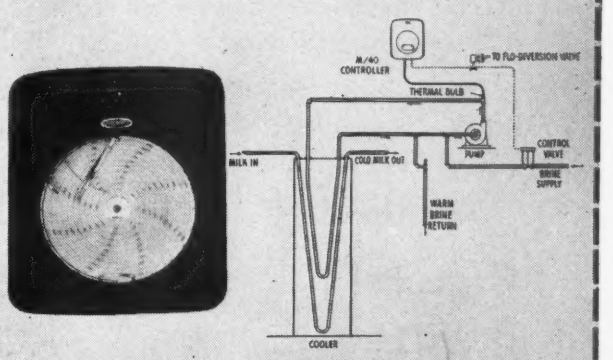
1 FOXBORO ON-OFF CONTROLLER

This simple recording controller turns heat on or off to maintain desired temperature. For smokehouses; canning retorts; bakery proofrooms; ham, jam, candy kettles; dehydrators, and other batch processes.



2 FOXBORO MODEL 41 CONTROLLER, on-off or proportional.

Ideal indicating controller, moderately priced. For exhaust boxes, cooling canals, lye peelers, water heaters, continuous dehydrators, canning and similar processes.



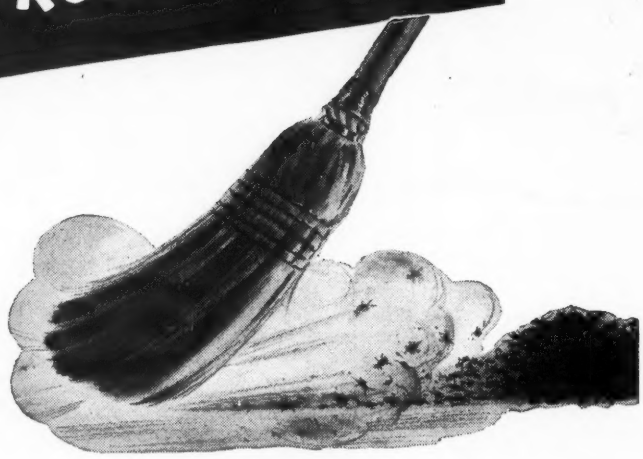
3 FOXBORO MODEL 40 CONTROLLER

On-off, proportional or proportional with Hyper-Reset action. Gives matchless performance on H.T.S.T. milk pasteurizers, continuous pasteurizers, heat exchangers, evaporators and like processes.

FOXBORO REG. U. S. PAT. OFF.

RECORDING · CONTROLLING · INDICATING **INSTRUMENTS**

RUN IT ONCE . . . and Sweep up the ROACHES!



Just one spraying of West Vaposector Fluid through the *new West Vapomat* will make "panic-stricken" roaches, within an area of 50,000 cubic feet, come crawling out of their hiding places to be killed easily. Other crawling insects get a taste of the same "medicine."

Also, a "once over" with this 2-weapon offensive has enough concentrated killing power to *achieve a "positive kill" of flying insects within areas of 500,000 cubic feet.*

Perfected by West as the perfect partner to Vaposector Fluid . . . quick, light to handle, automatic and economical . . . the new electrically operated West Vapomat requires no manual attendance in operation. Just fill it . . . plug it into AC or DC outlet and set the time clock for sure guaranteed results. ODORLESS Vaposector Fluid is harmless to food and fabrics.

One of over 475 West representatives throughout the country will be glad to discuss with you the merits of both the West Vapomat and Vaposector Fluid. Fill in coupon below for free demonstration!

Products That Promote Sanitation

WEST DISINFECTING Company

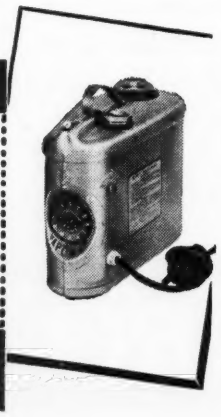
CLIP TO YOUR LETTERHEAD

42-16 WEST STREET
LONG ISLAND CITY 1, N.Y., DEPT. F

We are interested in a demonstration of the new West VAPOMAT ☐ Please send Literature ☐

Free!

Name_____ Position_____



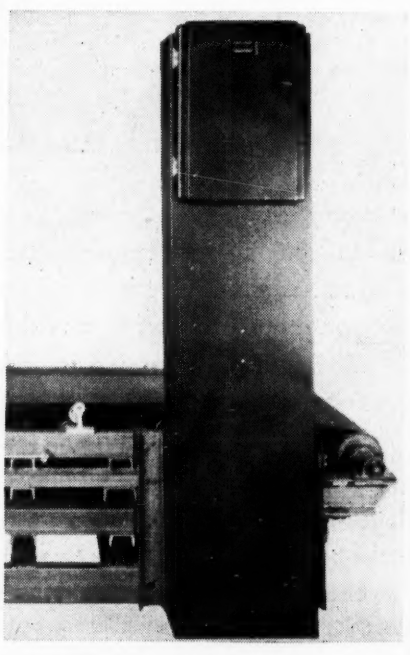
CLEANSING DISINFECTANTS • INSECTICIDES • KOTEX VENDING MACHINES
PAPER TOWELS • AUTOMATIC DEODORIZING APPLIANCES • LIQUID SOAPS

as rapid in the longest schedules as in the shortest.

The time selector wheel carries 150 keys, selected to provide timing to within 0.67 of 1 percent of the overall time range, for each successive event scheduled in the operation selector. Standard cycles available to 750 min. Selector camshaft, with 10 working positions, operates pilot valves or precision switches in any desired sequence. Resetting is automatic at completion of the program, requiring one sec. per unused operation.

Single Service Milk Can 25

A SINGLE service 40-qt. can for shipment and storage of milk, cream, condensed milk or ice-cream mix, is announced by the Conneaut Can Co., Dept. I, Conneaut, O. It weighs 5⅛ lb., has a 6-in. plug seal opening with seal drawn so it may be crimped on, has heavy wire handles, is sufficiently rigid to stand decking and may be washed in a rotary style washer.



Continuous Weighing 26

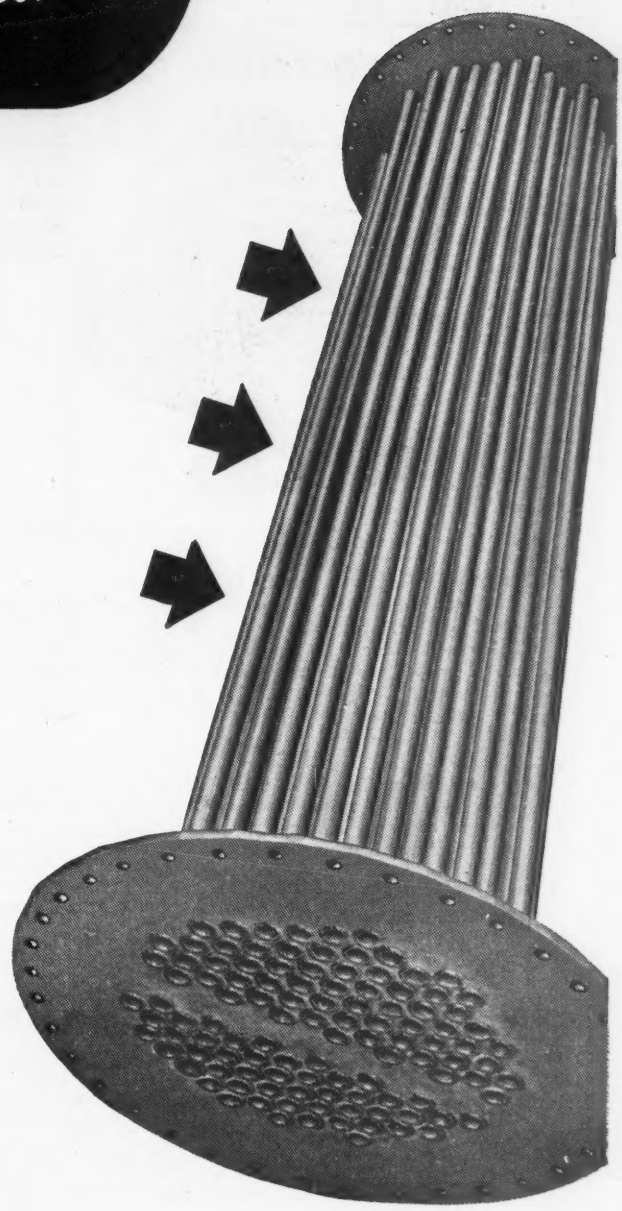
THE Conveyoflo meter, which utilizes diaphragms instead of knife-edge-beam principle for metering flow of dry materials by weight, is offered by Builders-Providence, Inc., Dept. I, Providence, R. I. It may be used to proportion and control as well as to weigh, and to control the flow of liquids in proportion to dry materials. The weighing section is supported at one end by self-aligning pillow blocks and at the other end floats on a diaphragm which transmits load changes hydraulically to the weighing mechanism. The cyclometer type totalizer reads directly in any unit desired and is automatically corrected for any belt speed variation. Integration is automatically compensated for variations in belt weights and for adherence of materials to the belt, through a system of return belt weighing.

HERE'S A GOOD WAY *to Reduce Tube Replacement ...*

To guard against the wasted time and labor that tube replacement costs, it pays to look for *more than analysis* when you select Stainless Tubing.

For example, special finishes to provide *extra protection* against corrosion or contamination can often be provided in Carpenter Stainless Tubing. *Uniform wall thickness* is another Carpenter Stainless Tubing advantage that will help you specify lighter gauges . . . and keep equipment on the job with fewer shutdowns for replacement and repair.

To make each of your Stainless Tubing dollars work harder and longer, drop us a line. Carpenter's 20-year experience with Stainless Pipe and Tubing problems is yours for the asking.



OVER 100 PAGES OF USEFUL INFORMATION ABOUT STAINLESS TUBING

To help you make full use of the properties of Stainless Tubing, fabricate it and improve processing, the new Carpenter Stainless Tubing Data Book is available to Engineering and Management executives. A note on your company letterhead will bring a copy to you.

THE CARPENTER STEEL COMPANY

Alloy Tube Division • 109 Springfield Road • Union, N.J.

Carpenter

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"

STEAMASTER BUILDS BOILERS WITH PLENTY OF GUTS!

For FOOD PROCESSING

WATER TUBE
DESIGN
INCLINED TUBES
SECTIONAL
STEEL HEADERS
LONGITUDINAL
DRUM

▲ THE GUTS OF THE STEAMASTER BOILER

Steam is water plus heat . . .

It is HOW that heat and water are utilized that makes a boiler good or bad. Now take a look at the guts of the Steamaster Boiler — the famed water tube principal, combined with sectional steel headers and inclined tubes gives you a superior design resulting in high thermal efficiency and economical maintenance . . . at no greater cost than an average so-called "packaged" boiler.

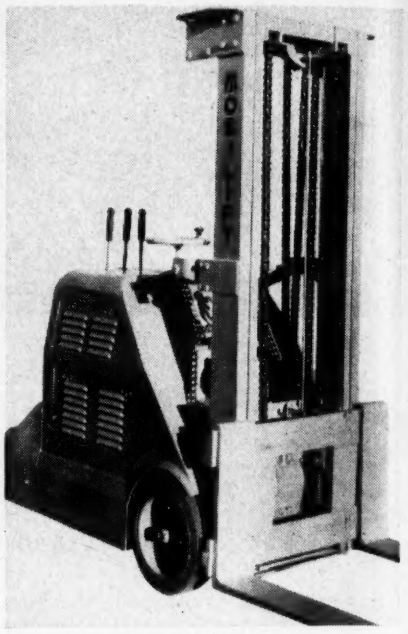
Yes . . . Steamaster Boiler s have the guts that enable them to be fired over their rated capacity with no loss in efficiency — the guts to keep on economically filling food processors' steam requirements year after year.

THE ADVANTAGES OF A STEAMASTER WATER TUBE BOILER FOR FOOD PROCESSORS

EASY INSPECTION AND MAINTENANCE. Every tube immediately accessible. Just open the heavily insulated access doors.
LARGE COMBUSTION AREA.
THREE PASS HEAT BAFFLING. Gives high thermal efficiency—Economical consupmtion of fuel.
POSITIVE TIDAL CIRCULATION OF WATER maintains all parts at equal temperature.
CONDENSATE RETURN SYSTEM BUILT-IN. As an integral part of all boilers of 60 h.p. and up.
CHOICE OF FUEL—GAS, OIL OR COAL. Whatever your fuel requirement is, there is a Steamaster Boiler to fill it. Use Gas, Oil or Coal or any combination.
FULL RANGE OF SIZES from 10 to 300 h.p. as illustrated. The Model A for 3½ h.p. —5 h.p. and 7½ h.p.
FULLY EQUIPPED FOR AUTOMATIC OPERATION. Finest accessories.
A.S.M.E. CODE—NATIONAL BOARD APPROVED. Inspected and certified by Hartford Steam Boiler Inspection and Insurance Co.

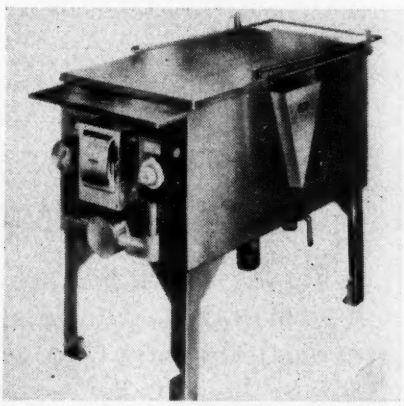
POWER ENGINEERS AGREE
STEAMASTER IS THE BOILER WITH PLENTY OF GUTS.

Steamaster
AUTOMATIC BOILER CO.
Compton at Slauson Ave., Los Angeles 11, Calif.
Sales and Service in all Principal Cities



Gas Powered Lift Truck 27

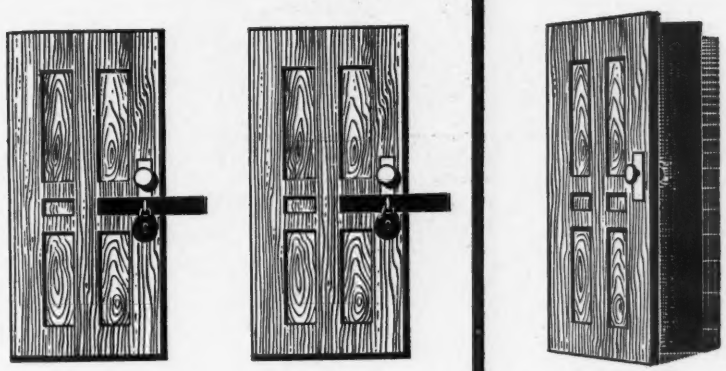
A NEW Model F, Mobilift with a rated capacity of 3,000 lb. on a 15 in. load center is announced by General Equipment Co., Dept. I, Portland 17, Oregon. It weighs approximately 4,450 lb., and is equipped with a specially designed, 20 hp., 3-cylinder, air-cooled engine. It requires no gear shifting and has an overall turning radius of 61 in. It is equipped with roller chain lift, available in lifting heights of 68 or 108 in.



Chocolate Heater 28

A NEW, electrically heated, jacketed stainless steel kettle for heating chocolate in ice cream and candy plants, sirups, waxes and paraffin is announced by the D. C. Cooper Co., Dept. I, 1467 S. Michigan Ave., Chicago 5, Ill. It is heated by an electric immersion type element controlled by a thermostat, and is equipped with two 1 in. drains for quick draining of both inside and jacketed chambers. The funnel-shaped water jacket intake is fitted with a cover for sanitation. A convenient, easily read 3 in. dial thermometer is a part of this unit. Rounded corners inside the kettle permit fast, easy cleaning. An added feature is the steel drain shelf which

2 OUT OF 3



DOORS ARE CLOSED TO YOU UNLESS

Important doors, behind which live important people, the Hometowners of eleven Western States. They out-number the dwellers in the 6 largest cities nearly 3 to 1!

Vitally important to you if you have anything to sell that people ride in, eat, drink, or wear. Because, these Hometown people account for ⅔ of the total retail sales in this great western trading area. They should. Actually, they number more than 11,225,000!

Yet, 2 out of 3 of their doors are closed to any newspaper advertising that doesn't appear in their Hometown Daily Newspaper.

Mighty good salesmanship to get acquainted with these Hometowners. Mighty good way to get acquainted through their favorite daily newspaper, the one the whole family reads. No other advertising medium swings open those doors as effectively as the Hometown Daily Newspaper.

Over 90% of the 5,687,000 total circulation of all daily newspapers in the eleven Western States is confined to the city and the retail trading zones in which they are published.

Good-sized advertising in the Hometown Daily Newspaper costs less than one cent per family you reach.

THIS WESTERN HOMETOWN MARKET IS AMERICA'S THIRD GREATEST SALES AREA

Only THE HOMETOWN DAILY NEWSPAPER *covers this Primary Market*

For complete information write to

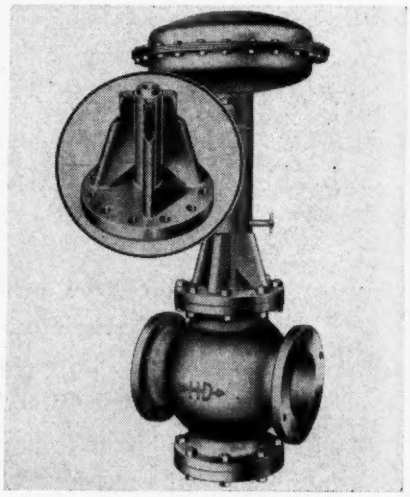
Hometown Daily Newspaper Publishers— 625 Market Street, San Francisco 5, California

Freshness
MAINTAINED
UNDER ALL CONDITIONS WITH
Steri Seald
LINED STEEL
CONTAINERS
An exclusive Inland Steel Container product
Berries, preserves, fruits, jellies, syrups and foods of all kinds packed for shipment or storage maintain their original freshness and purity in Steri Seald Lined Steel Containers. Frozen foods freeze faster and thaw faster and have the complete protection against contamination or leakage that only a steel container can give. Steri Seald lined drums and pails represent the highest achievement in bulk packaging of foods.
No. 5518B Lever Locking Ring Drum
No. 584 Lug Cover Pail
No. 514X Lever Locking Ring Pail
No. 584R Swivel Spout Por-Pail
No. 594Q Closed Top Pail
INLAND STEEL CONTAINER CO.
Container Specialists
6532 S. MENARD AVENUE, CHICAGO 38, ILLINOIS
PLANTS AT CHICAGO • JERSEY CITY • NEW ORLEANS

serves as a lid when the unit is not in use. Inside dimensions: 26x13x12 in. deep. Drain board: 30 in. x 18 in. Heating element: 3,000 watts. Current: 220 volts a.c.

Automatic Fruit Vender 29

"FRUIT-O-MATIC" is the name of a fully automatic, refrigerated vending machine that will deliver the correct change and a cold apple, orange, or pear for the mere insertion of a 5 or 10 cent piece. It is quickly and easily loaded with 208 individual pieces of fruit by unlocking and opening the front triple-plate display glass. Four separate rotary bands, electrically operated, individually control the vending of 52 pieces of fruit each, therefore permitting each machine to vend four different types of fruit at a cost to the consumer of anywhere from 1 to 10 cents. Machines will be leased or sold by Kold Krisp Apple Service, Inc., Dept. I, Van Nuys, Calif.



Finned Valve Bonnet 30

APPLICATION of the verticle type fin radiation bonnet to their complete line of diaphragm control valves in sizes 2 in. and larger, is announced by Hammel-Dahl Co., Dept. I, Providence, R. I. With the valve installed in the normal vertical position, the "U" section permits a natural draft which cools the packing box section of the valve when high temperature fluids are being handled. Tests indicate 35 percent better heat dissipation than conventional horizontal fin designs.

Iron-Enriching Tablets 31

INCLUSION of iron in the form of ferrous sulphate, in its bread enrichment tablets—B-E-T-S, is announced by Winthrop Chemical Co. Inc., Dept. I, 170 Varick St., New York, N. Y. These tablets were produced over a year ago and after continuous field tests in commercial bread production have been found to distintegrate quickly and disperse completely, assuring uniform enrichment of bread.

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Food Processing 51

Chisholm-Rider Co.—175-page illustrated catalog No. 47, "The Best of Everything For the Food Processor." Contains illustrations and descriptions of the complete line of food processing equipment made by this company. Also included are diagrammatic sketches of various vegetable processing lines.

Magnets 52

"Why Every Food Processing Plant Needs Eriez Protection" is the title of the May Special Food News Bulletin by Eriez Mfg. Co. The operation of Eriez magnets, to protect food products from tramp iron in a number of operations, is diagrammatically described.

Water Conditioning 53

American K.A.T. Corp.—4-page reprint of an article describing "K.A.T." colloidal water conditioning and case history of its application in the power plant of the U. S. Military Academy, West Point, N. Y.

Power Transmission 54

Boston Gear Works, Inc.—General Catalog No. 54, 320-page catalog containing specifications and list prices of gears of all types, speed reducers, motorized speed reducers, couplings, gears, bearings and other power transmission equipment.

Process Engineering 55

Research, Testing & Process Engineering, a 24-page, two-color publication of The Dorr Company, tells the story of Dorr engineering service in the broad fields of chemical, metallurgical and industrial processing.

Hydropress Pump 56

"The Hydropress Pump," 12-page bulletin No. 46—6,000 recently issued by the Byron Jackson Co. In three colors, it covers technical data, application pictures, cross section drawings of parts, operation and design features, dimensional sketches, and assembly procedure.

Filling Machine 57

The Karl Kiefer Machine Co.—4-page bulletin on the Kiefer Vari-Visco filling machine for packaging viscous products such as preserves, jellies, mayonnaise, sirup and baby food.

Weight Checking 58

The Fred Goat Co., Inc.—6-page folder on "Weightrol," the new automatic weight indicator and control device for package filling machines. Contains illustrations, descriptions and specifications.

V-Belts 59

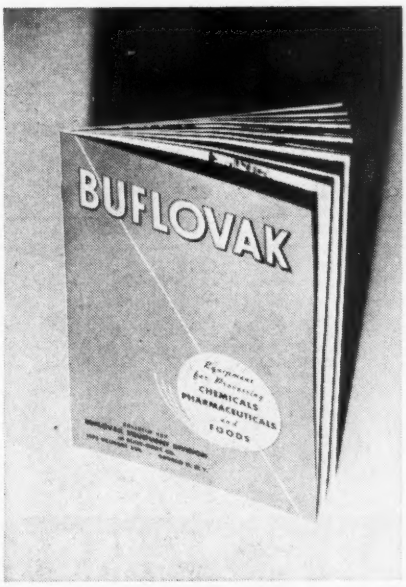
"Power Transmitted Throughout Industry" is the title of a new folder by The Dayton Rubber Mfg. Co. It gives the advantages of rayon cord in V-belts; tells when cog belts should be specified; for what types of application steel cable V-belts should be used; how to combat conditions of excessive oil, heat or static, and many other hints.

Boilers 60

Kewanee Boiler Corp.—Catalog 88-4 describing Kewanee Square-Heat Type R boiler for oil, gas, stoker or hand-fired coal. Contains illustrations and specifications.

Processing Equipment 61

Buflovak Equipment Division of Blaw-Knox Co.—24-page bulletin 337. Contains installation photographs and descriptions of the full lines of Buflovak equipment, including the following food plant equipment: Driers; extractors; evaporators; fumigators; process kettles; dopp kettles; sterilizers, and deoilers.



Valves 62

Ohio Injector Co.—248-page catalog illustrating and describing the line of valves manufactured by this company.

Refrigerating Plates 63

Brewer-Titchener Corp.—4-page bulletin on the new type stamped evaporator plate for use in refrigerating applications made by this company. Contains photographs showing the forms in which the plates may be fabricated, line drawings and specifications.

Steam Jets 64

A new 8-page bulletin, No. 1804, published by The Duriron Co., Inc., gives a complete description of Durco corrosion-resistant steam jets. It describes the special alloys of construction which enable the jets to heat, agitate and circulate corrosive solutions safely. A chart is included which makes it simple to calculate the proper size jet and steam consumption. Complete data on sizes and capacities, dimension drawings, and a section on how to install and operate are included. Information on steam fittings and scouring plates is also provided.

Pumps 65

The Bell & Gosset Co.—Bulletin 6B 1241. A 4-page leaflet featuring a booster pump made by this company. This pump can be installed in six different positions. It is used for forced hot water heating systems and for circulating service water systems.

Strainers 66

Yarnall-Waring Co.—4-page, 2-color, illustrated Bulletin 5-201 on Yarway fine screen strainers. Contains photographs, line drawings, descriptions and specifications of strainers, both screwed and flanged, in pipe sizes from ¼ to 3 in.

Couplings 67

Industrial Machine Works, Inc.—4-page folder featuring the flexible couplings made by this company. Construction features are shown. Contains a table of specifications and dimensions for the various sizes of gear-tooth flexible couplings.

Water Hammer 68

Wade Mfg. Co.—New 6-page booklet, "Water Hammer—Its Cause and Cure," includes the most authoritative information on water hammer yet assembled. Condensed facts are presented in simple, easily understood language. The Wade sealed air chamber is introduced. Also included are handy selector tables and pressure flow charts.

Dehumidification 69

Cargocaire Engineering Corp. Two booklets featuring this company's equipment for dehumidifying cargo space in ships for the protection of various types of cargo.

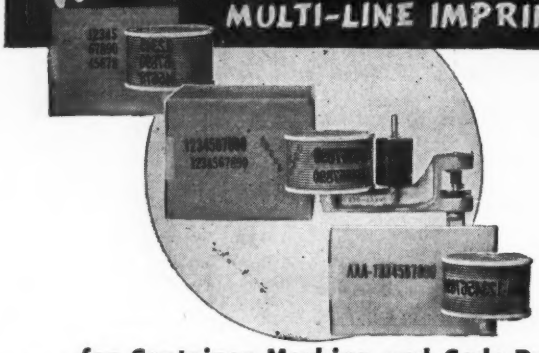
Cleaning Unit 70

A special, 12-page illustrated booklet describing the new, improved Oakite-Vapor Steam Cleaning Unit has just been issued by Oakite Products, Inc. Data on construction, engineering

HOW TO GET THIS LITERATURE

Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

Now! FAMOUS ROLACODER affords MULTI-LINE IMPRINTS



. . . for Container Marking and Code-Dating

● Automatic package marking with legends containing up to *five lines of type* now is possible with the newest ROLACODER models. Attached to a conveyor, packager or sealer, ROLACODER imprints at almost any spot on top or side of cartons, crates, kegs, drums, etc., without interrupting their movement.

● Interchangeable rubber type feature permits quick changing of imprint legends . . . use of variety of type sizes and styles . . . use of legends containing one to five lines of copy. Self-inking.

● ROLACODER is friction-operated . . . requires no labor, extra time nor outside power. Easily installed without altering present equipment.

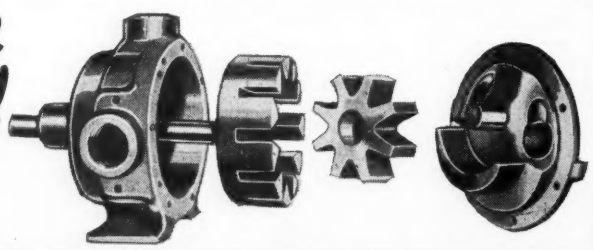
● Write for descriptive literature . . . and state exact nature of your marking needs.

ADOLPH GOTTSCHO, INC. MARKING EQUIPMENT

191 Duane St., New York 13, N. Y.

* MACHINES TO MARK WHATEVER YOU MAKE *

Here's the Works! ...in



VIKING ROTARY PUMPS

Simple to the nth degree. Just 2 moving gears—one within the other. Both self supported. Positive in action. Smooth, even flow with no pulsation. Handles any clean liquid regardless of viscosity. Low speed. Full, fast delivery. Long life. Complete line of models and sizes with pressures ranging from 5 to 500 psi. depending on style of pump.

If it is your job to see that liquids are moved, see Viking for the answer. Write today for the folder that will help you—100E.

See Our Catalog In SWEETS

VIKING PUMP COMPANY

CEDAR FALLS, IOWA

specifications, types of models available and job applications are factually presented in concise form. The text has been augmented by a series of clear-cut illustrations of operating, control and mechanical features; types of models available; and interesting views of the unit in actual steam-cleaning operations of various kinds.

Corrosion Resistant Valves 71

Alloy Steel Products Co.—54-page, 2-color catalog No. 47 contains complete descriptions of all standard Aloyco corrosion resistant valves and fittings, together with photographs and cross sections in halftones, dimensional data and list of alloys in which each style is stocked.

Filling Equipment 72

Cass Products Co.—4-page catalog on Cass filling and weighing equipment for free flowing liquids. Describes, with illustrations, the mechanically operated types for 2 oz. to 1 gal. and semi-automatic operated types for 1 pt. to 5 gal., in both single and double units. Also folder on Speedway valves for filling cans, bottles, pails, carboys or drums with free flowing liquids.

Materials Handling

Pneumatic Conveyors 73

Convair Corp.—8-page Bulletin No. 101 on pneumatic conveying systems for the chemical, food, glass, steel and allied industries. Contains a number of installation drawings, together with descriptions of the various systems.

Hand Trucks 74

The popular line of Wheel-Ezy steel hand trucks is illustrated and described in a single page, 2-color bulletin WE-24P by the Rapids-Standard Co., Inc. Photographs show both single and double-handled models and illustrate various uses of this truck.

Conveyor Belts 75

A new 4-page catalog section on its line of conveyor belts has been published by The B. F. Goodrich Co. It gives details of each of its brands of special construction available in various belts, as well as a list of the applications in which they are most commonly used.

Control Equipment

Steam Specialties 76

Wright-Austin Co.—Bulletin No. 715 presents representative types of steam traps, separators and boiler trimmings from the company's complete line. Illustrates and describes 3 popular steam traps and 3 steam separators, together with 22 other products.

Instruments 77

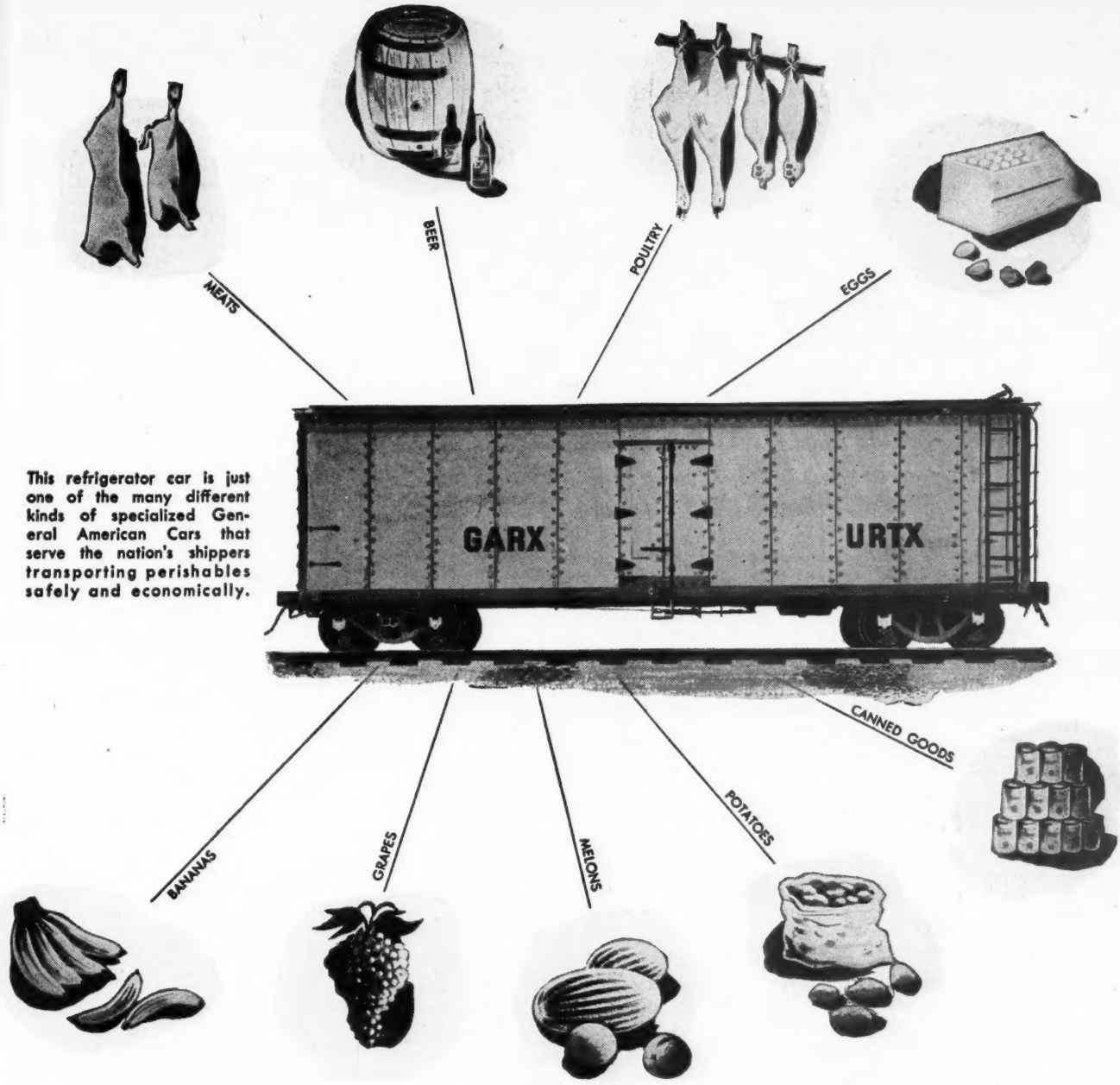
Palmer Thermometers, Inc. — Two leaflets featuring the thermometers with full reading scales available from this company. The thermometers have a double strength brass shield to protect the thermometer tube and to keep the thermometer clean.

Pyrometers 78

The Pyrometer Instrument Co.—Catalog No. 160 illustrating and describing in detail the new Pyro surface pyrometer, designed especially for a quick and accurate method of determining surface and sub-surface temperatures in laboratory and plant.

Control Equipment 79

A new bulletin, No. W-1811 listing over 150 different items maintained in stock for immediate delivery has been



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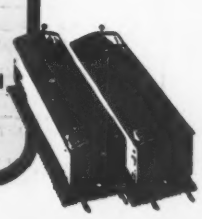

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Fortify fluid milk and other food products with the purest, most potent known form of vitamin D_2 by using Calciferol.

With propylene glycol as a carrier, Calciferol is an effective way to fortify fluid milk with vitamin D because propylene glycol disperses vitamin D throughout milk without the use of emulsifiers.

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Calciferol
(PURE CRYSTALLINE VITAMIN D_2)

Calciferol is the name applicable only to the superior, pure crystalline product as so recognized and used throughout the world.

published by The Bristol Co. It lists recording thermometers, pyrometers, pressure gages, voltmeters, ammeters, pH recorders, recording controllers, indicating controllers, miscellaneous instruments and accessories.

Smoke Indicator 80

Ess Instrument Co.—Bulletin of new model smoke indicator which was brought out for use with oil and stoker fired equipment utilizing a bell alarm to notify the operator when he has reached a point that violates city smoke ordinances.

Plant Supplies

Chain Lubricants 81

Bel-Ray Co., Inc.—"The Stream of Life to Hot Oven Chains." 4-page folder on Bel-Ray oven chain lubricants. "The Bel-Ray System of Oven Chain Lubrication," a 5-page folder containing descriptions and illustrations on a system which eliminates the old hand methods of application and does a better job of lubricating at less cost.

Germicides 82

Edwal Laboratories, Inc. — Booklet describing the characteristics and uses of phenyl mercuric compounds as germicides and fungicides.

Labels 83

Ever Ready Label Corp.—Full-size label catalog, "Tools of Business." Contains a wide variety of "Tested by Experience" labor designs for shipping, packaging, advertising and other uses. Especially designed for use by the prospective label buyer with limited knowledge of label production, design, paper and cost.

Aluminum Foil 84

Milprint, Inc.—New folder describing Milprint's low-temperature heat-sealing aluminum foil. The advantages of "Seal-Tite" as outlined will prove interesting to producers of candy, potato chips, frozen food, dried fruit and ice cream.

Miscellaneous

Surface Radiation 85

Warren Webster Co.—8-page bulletin B-1550A on Webster Type WI Radiation. Contains construction details, applications, dimensions and rating tables together with numerous illustrations.

Stainless-Clad Steels 86

Lukens Steel Co.—Bulletin 338 describes Lukens Stainless-Clad Steels, and gives applications for the most important types of stainless cladding. Important steps in the Lukens method of producing stainless-clad steels are illustrated. Contains several pages of corrosion data, size and weight tables and photographs.

Sprinklers 87

Automatic Sprinkler Corp. of America—20-page Bulletin No. 56 entitled "Automatic Sprinkler Systems." This offers advice on such factors as degree of hazard, type of construction, temperature, direct and indirect effects of possible fire and water damage. Contains illustrations and line drawings.

Industrial Management 88

Hall & Liles — Brochure entitled "Changing Attitude in Industry" discusses increased production and better employee relations. Specialized programs for dealing with these problems are described.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

STORAGE

Oiling Egg Shells

PREVENTION of evaporation is the most noticeable effect of oiling fresh shell eggs. At 70 deg. F. oiled eggs were judged grade A (air cells 3/16 in. or less) after 10 weeks storage, while unoiled eggs had large air cells and were judged grade C by candling after 6 weeks. Oiled eggs were still grade A after 32 weeks at 30 deg. F., while control eggs graded B after 16 weeks, and C after 40 weeks. Measurements of weight loss, yolk index, thick white height and pH, also showed the value of oiling in maintaining egg quality when eggs are stored at 70 deg. F. Weight loss of oiled eggs was ¼ to 1/10 that of the controls, depending on the kind of oil used.

Oils with Saybolt viscosities of 70/100 at 100 deg. F. prevented weight loss better than oils of lower viscosity. Heavy oils diluted with mineral spirits were not as effective as similar oils of lighter viscosity. Petrolatum and magnesium stearate additions improved light oils. Eggs dipped in oils held at 76, 100, and 130 deg. F. did not differ appreciably in quality nor was the amount of oil retained by the eggs (0.03 to 0.08 g. per egg) affected. With commercial oiling equipment, however, about twice as much oil of viscosity 70/90 is required as of oil with viscosity of 50/70.

Digest from "Preservation of Eggs. VI. Effect of Various Oils and Oiling Temperatures on the Keeping Quality of Shell Eggs Stored at 70 deg. F. and 30 deg. F." by N. E. Gibbons, R. V. Michael, and U. Irish, *Canadian Journal of Research*, vol. 25, 141-148, March, 1947.

FISH

pH of Fish Fillets

FISH fillets undergo pH changes on their surface and interior after preparation, but the correlation between such changes and the freshness of the fish is not sufficient to be used as an index of quality. Live fish muscle has a pH very close to 7.0. The flesh of fish that have struggled on being caught is slightly acid at death, and becomes more so as rigor mortis sets in, reaching a minimum of 6.5 or lower both on the surface and in the interior of the muscle. After a few days, bacterial action on the surface releases amines which raise the pH to 7.0 or even higher, while the pH of the interior rises more slowly. The differential in pH between surface and interior has been suggested, therefore, as a freshness index.

Measurements on fillets of haddock, whiting, dabs, pollock, cod, rosefish and gray sole showed that pH of fillet surfaces and interiors rose as the fillets became progressively more unfit for food. The best correlation between pH of the surface and spoilage was obtained with whiting, haddock and dabs. With other species there were wide pH variations among fillets judged equally fresh by organoleptic tests. On frozen and thawed fillets the pH changes were quite erratic.

Digest from "Evaluation of Surface pH as a Freshness Index for Fish Fillets," by R. P. Elliott, *Food Research*, vol. 12, 87-98, March-April, 1947.

PACKAGING

Waterproofing Containers

WATERPROOFING of fiberboard cartons by dipping them in solutions of resins, oils, waxes, or nitrocellulose, after closing them, is successful only if the waterproofing material leaves a surface coating that seals the seams and corners of the carton.

Test packages were filled with sawdust, closed, and dipped into the solution of waterproofing agent, dried and immersed in water and left till failure, or for a month, whichever period was shorter. Materials that showed promise on the initial test were subjected to a rough-handling test (20 free falls of 3 ft. each), a flexibility test, and an accelerated aging test (one month at 140 deg. F. and 6 percent relative humidity).

Of the 17 materials tested, oily solutions were unsatisfactory as they did not leave surface films. Low viscosity-resin or rubber solutions did not seal seams or corners. Waxes were unable to withstand rough handling at low temperatures. A nitrocellulose solution in a mixed ester solvent, plasticized; and a vinyl chloride acetate copolymer, dissolved in acetone and plasticized, gave best results. Double-dipped cartons coated with these materials were sound after 30 days in water and after both the rough-handling and the aging treatments.

Digest from "Packaging VII. Waterproofing of Fibreboard Containers," by C. G. Lavers, *Canadian Journal of Research*, vol. 25, 128-132, March, 1947.

MICROBIOLOGY

Food Poisoning Organisms In Custard Type Fillings

VANILLA type fillings, pumpkin, squash, and sweet-potato pie fillings, cheese cake fillings, and whipping cream mixes all support *Staphylococcus* growth unless the pH is reduced to 3.43-3.65 with citric acid, in which case the product has a sour taste. Sodium propionate, at the rate of 16 g. per 3½ lb. of vanilla type filling, did not inhibit growth. Fruit fillings, such as peach and raspberry, contain sufficient acid to check the growth of organisms.

Cheesecake fillings support growth of *S. aureus* at pH 5.21-5.32. If hydrogen ion concentration is increased to pH 5.12 or lower, growth is suppressed. Lactic acid

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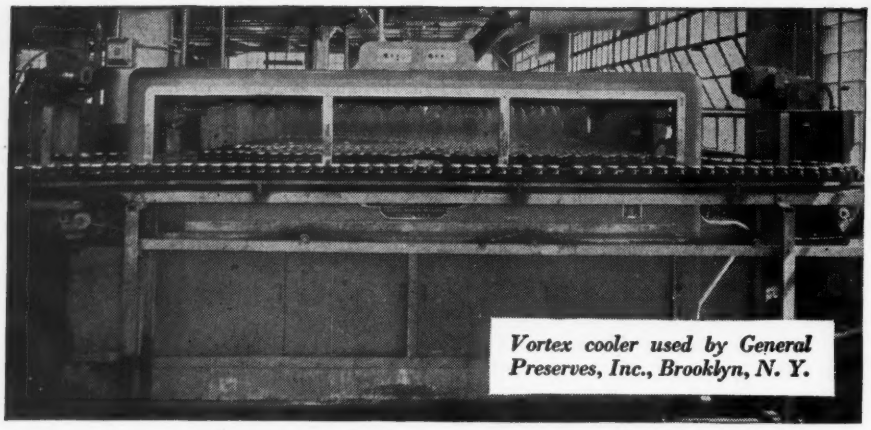
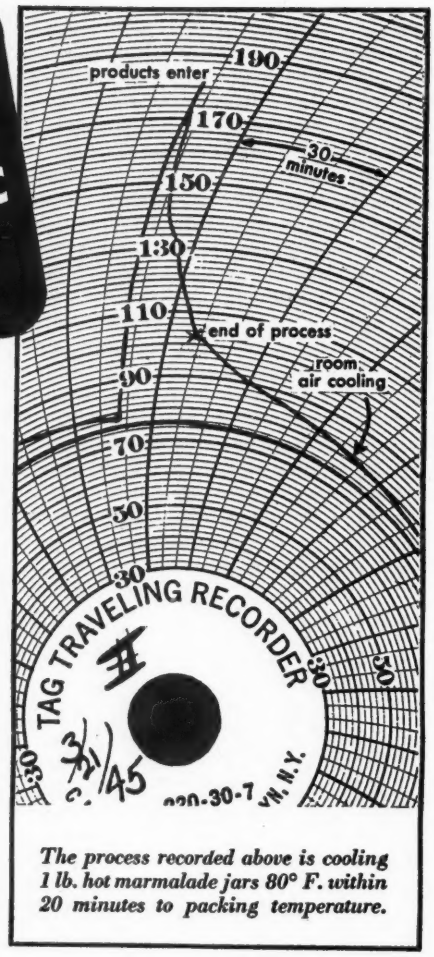


Vortex cooler used by General Preserves, Inc., Brooklyn, N. Y.

Your Hot Packaged Foods Deserve

VORTEX Automatic Cooling



The process recorded above is cooling 1 lb. hot marmalade jars 80° F. within 20 minutes to packing temperature.

Automatic cooling of your products deserves scientific treatment to preserve the original flavors and clarity by *positive* control of time and temperature.

The Vortex system is entirely automatic in operation and can be run continuously without operators, requiring only routine maintenance. The heat exchange medium is atomized water, distributed over the containers in such a manner that maximum cooling is achieved with a minimum quantity of water.

Vortex coolers are widely adaptable to individual requirements and have an almost limitless capacity range for all sizes of jars, bottles or cans. The use of these machines greatly conserves floor space and allows for immediate labeling and packing. A rapid drying system can be supplied with the discharge conveyors, if desired.

Whatever your problem of cooling—or heating—your products, it will pay you to learn the Vortex method of achieving uniform results economically. Send us your process requirements and write for bulletin No. 87 today.

BARRY-WEHMILLER MACHINERY CO.

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gives a better tasting filling than citric acid when used for this purpose, and effectively retards growth between pH 4.42 and 4.67.

Whipping-cream-type mixes, made up of sweet butter, vegetable shortening, skim milk powder, sugar and water support growth of *S. aureus*, since their pH range lies between 5.85 and 6.22.

Digest from "Growth of *Staphylococcus aureus* in Various Pastry Fillings," by W. H. Cathcart, W. J. Godkin, and G. Barnett, *Food Research*, vol. 12, 142-150, March-April, 1947.

MEAT

Loss of Nutrients In Frankfurters

FRANKFURTERS from 10 different packing houses showed a wide variation in moisture, ash, protein and fat content, but relatively slight variation with respect to animal casings or skinless type of product. The skinless type was slightly lower in moisture, protein and ash and slightly higher in fat than frankfurters packed in animal casings.

When cooked in boiling water, then cooled to 140 deg. F. in the water, samples of both types retained over 96 percent of their original solids. The chief material lost was ash; fat and protein changing little. When given a "severe cook," by boiling for ½ hr. they retained about 91 percent of their original solids. This cook increased the loss of mineral matter and reduced the fat content 5 to 10 percent. Protein was not affected.

Digest from "Variation in Composition of Frankfurters with Special Reference to Cooking Changes," by F. W. Tauber and J. H. Lloyd, *Food Research*, vol. 12, 158-163, March-April, 1947.

Tenderizing Beef

BEEF carcasses reach a "plateau" of tenderness after 17 or 18 days' storage and in some cases actually become tougher for a week to ten days. These conclusions were reached by judging broiled steaks cut from the *longissimus dorsi* muscles of beef carcasses, stored in a 33-35 deg. F. cooler, at intervals over a 41 day period. On a scale of 10 for very tender to 2 for very tough, steaks from 12 animals had initial scores of 3.08 to 5.17, averaging 4.24. The average score increased to 6.90 on the 17th day, remained at that level or dropped slightly as shown by a score of 6.84 on the 24th day and rose to a score of 7.61 on the 31st day.

(*Continued on page* 182)

even more nutritious

TODAY—progressive steps are being taken to secure better nutrition for all America.

More and more food is being enriched.

Candy manufacturers are undoubtedly giving thought to this subject, and considering means and methods of providing better nutritional values.

Surely—with a product so popular and so widely used as candy—these manufacturers have an opportunity to make a genuine contribution to the national diet.

Such a step would be a boon to American mothers. Their children, seekers of candy in all forms, would *automatically* receive better nutrition.

Standard Brands Incorporated has spent much time and research in recent years, developing products for Vitamin B-complex, Vitamin D and protein supplementation of foods. These products are known for their dependability and uniformity.

If you are now seeking ways of fortifying your company's products—whether candy or some other food—we invite you to discuss your needs in confidence with one of our executives.

Products containing
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Irradiated Dry Yeast

Fleischmann's Irradiated Dry Yeast
Type 700-H

Standard Brands Viosterol
(Activated Ergosterol) Steenbock Process

Products containing
NATURAL B-COMPLEX FACTORS

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A possible explanation of the plateau effect lies in the occurrence of two components in muscle, connective tissue and muscle plasma, which do not undergo the same changes on aging, nor do they change at same rate. It is thus possible for the changes to oppose or reinforce each other, leading to periods when no change in tenderness is taking place.

Digest from "Relation of Tenderness of Beef to Aging Time at 33-35 deg. F.," by F. E. Deatherage and A. Harsham, *Food Research*, vol. 12, 164-171, March-April, 1947.

DAIRY

Ice Cream Improver

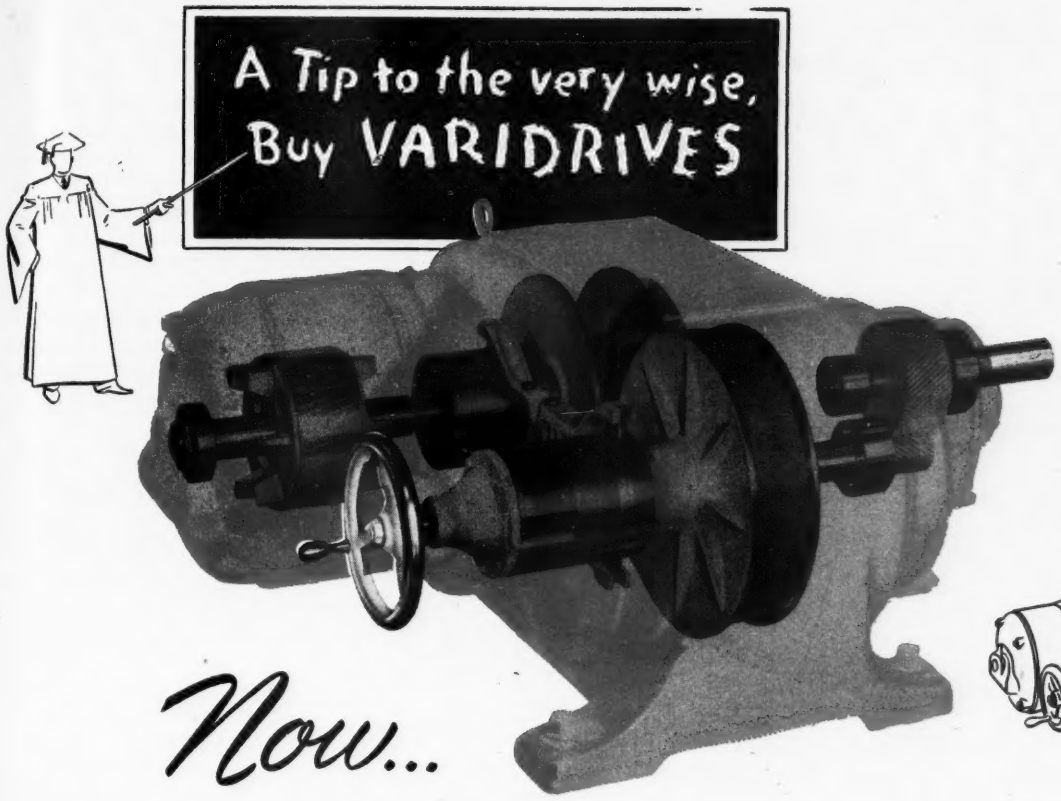
CONTROL of overrun, texture of the product, and reduction of time in obtaining overrun in ice cream are the objects of a recently patented invention. Incorporated with the usual ingredients is a small amount of an ester of fatty acid and polyhydric alcohol having one or more free alcoholic hydroxyl groups on the alcohol component of the ester. The material may be monoglyceryl ester or diglyceryl ester of a higher fatty acid or a mixture of both; specifically, the mono- or di-glyceryl ester of stearic acid. It is claimed that addition of such a substance to the ice cream formula yields overrun as high as 117 percent without the use of egg yolk, and obtains 100 percent overrun in half the time required without the ester and with improved texture.

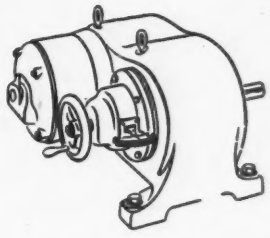
Digest from U. S. Patent Reissue 22,858, issued March 25, 1947, on an application dated September 21, 1946, to Warren D. Roth, Leo C. Brown, and Guy W. Phelps, and assigned to Industrial Patents Corp., Chicago, Ill.

Oxidation of Butterfat

DETERIORATION of highly flavored, high-acid butter is accelerated by high salt content. Previous studies had suggested that a new form of catalysis of fat oxidation was involved in this activity of acid and salt, and an investigation was undertaken to determine the mechanism.

Data on the effect of distilled water and synthetic inorganic butter-serum, on the rate of oxidation and butterfat indicated that the dispersed water or serum accelerated oxidation. Experiments, made to determine whether traces of heavy metals might account for the oxidant activity of salt in the acid solution, led to the conclusion that sodium chloride is responsible for the acceleration of oxidation.





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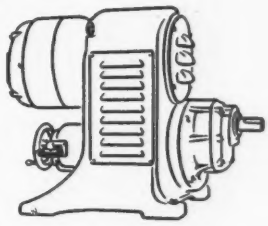
for a few dollars more you can have *Varidrive* instead of a fixed speed motor



When you select your next motor, pause for a moment and think of all the extra advantages variable speed will give to your machine.

It may surprise you to learn that you can now buy a *U. S. Varidrive Motor* for not too many dollars more than an ordinary motor will cost. But the savings it will return to you will pay and repay this small difference in cost for years to come in many ways.

A *Varidrive* does more than give you thousands of speeds. It gives you precise control that fits the operator's rhythm of movement. It will help synchronize production flow. Your machine will produce more because you can regulate its speed instantly to meet the varying conditions that arise day to day, hour to hour, minute to minute. You'll get more output from your shop labor—a better "frame of mind," less fatigue, complete satisfaction on his part,—because he will be operating with the best for the job.

The *U. S. Varidrive Motor* helps modernize your plant. It's the last word in motor power. It's compact, self-contained, occupies little more space than an ordinary motor—and it enables your present equipment to operate with more scope, at controlled tempo.

If you have never used a *U. S. Varidrive* you can't realize the uplifting effect it has upon the operator, as well as the increased versatility it gives to the driven machine. *So try one.* Put it through the paces. You'll be amazed at what it will accomplish. And bear in mind, its initial cost is little more than just a motor. You can't afford to operate without it.

Speed ranges up to 7 to 1. H. P. ¼ to 15. Built-in gearing available for lower speeds.

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Question:

Would you like to spend LESS money in cleaning equipment?

IN the busy plants of many well-known manufacturers of food products, the use of Oakite methods and materials has proved a starting point for effecting worthwhile savings not only in money, but in time and effort in equipment clean-up work.

Here Are the Reasons for This:

To each food product plant Oakite Personalized Cleaning Service brings a combination of practical experience, extensive knowledge of food processing and handling operations, familiarity with various equipment and metals, and highly important, the "know-how" of applying the most economical cleaning and germicidal methods and materials for more easily maintaining a high standard of equipment and plant sanitation.

Fact-filled Sanitation Manuals FREE for the Asking

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- Meat Packing
- Vegetable & Fruit Canning
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MATERIALS • METHODS • SERVICE

Comparative tests of the oxidant effect of several sodium and potassium salts, dispersed in sera of low and high pH, showed that the sodium ions played no part in the action, and that only the halides showed combined action with hydrogen in accelerating oxidation of fat. A suggested mechanism for the catalysis, supported experimentally, is the formation of chlorine by reaction between fat-hydroperoxide and hydrogen and chlorine ions, with the liberated chlorine then activating further oxidation.

Digest from "The Mechanism of the Oxidant Effects of Commercial Salt and Water in Butterfat," by G. I. Hills and J. Conochie, *Journal of the Council for Scientific and Industrial Research*, vol. 19, no. 4, November, 1946.

DEHYDRATION

Dried Whole Egg

SATISFACTORY dried whole egg powder can be made from frozen eggs, provided care is used in the freezing. Grade A, C, or cracked eggs gave good quality dried egg powder, while powders made from frozen musty eggs or incubator rejects had much higher fluorescence and KCl values. Increase in frozen storage time decreased the quality of the powder. Storage at –10 is better than at 10 or 0 deg. F. if the time is more than 6 months.

The kind of package used for freezing makes little difference, but the quicker the eggs are frozen the better the quality of egg powder made from them. Rapid defrosting is equally important, and the best quality dried egg was made from frozen egg defrosted in one hour. Dilution of the frozen egg during defrosting prior to drying also causes the egg powder to have higher fluorescence values and lower KCl solubility than undiluted egg.

Digest from "Dried Whole Egg Powder XXVI. Some observations of the Quality of Powder Prepared from Frozen Liquid Egg," by J. A. Pearce, H. Tessier, C. G. Lavers, and M. W. Thistle, *Canadian Journal of Research*, vol. 25, 173-179, March, 1947.

Gases in Dried Milk

THE quantity of gases held by adsorption and occlusion in particles of spray dried milk varies with the fineness of the product, and with the concentration of the milk from which the dried product is made, decreasing as the concentration increases. A large percentage of these gases can be removed by relatively short periods of evacuation within

add to your sales

When flavor and taste have much to do with product sales, they can often be increased by the use of Ethavan.

Ethavan is Monsanto's Ethyl Vanillin. It has long been a favorite with flavor manufacturers because of its distinctive flavor, and an aroma that is more pronounced, more intriguing, more pleasing. It has unusual staying power — both flavor and aroma last, even when subjected to high or low temperatures in processing. More economical to use — approximately three times stronger than vanillin.

Specify Ethavan in your vanilla flavorings — its use can readily add to your sales. Samples available. Contact the nearest Monsanto District Sales Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri . . . District Sales Offices: New York, Chicago, Boston, Detroit, Cincinnati, Charlotte, Cleveland, Birmingham, Houston, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Ltd., Montreal. *Ethavan: Reg. U. S. Pat. Off.*

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CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

2 STEPS in Cutting Costs of Handling Bagged Material

1 Install BAKER Fork Truck and Pallets

This will eliminate the back-breaking labor of handling individual bags manually, cut time and cost of car-loading or unloading, add storage space by tiering, and speed inter-department handling.

2 Get Suppliers to Palletize Shipments

This will cut time and cost of unloading incoming material. Supplier will make corresponding savings at shipping end with Fork Truck-Pallet combination. Damage in transit minimized.

Baker Fork Truck tiering pallet loads of bagged starch in storage. Note method of "locking" sacks to prevent side-slipping.

AT THE ERIE, PA. PLANT of one of our customers, raw materials such as clay, starch and talc, are received in bags. A typical carload will contain some 1600 bags, weighing about 50 lbs. each. These bags must be unloaded, stored, and transported to process departments as required.

This company took Step No. 1 years ago, and from the receiving point all bagged materials are carried in unit loads on pallets by fork truck. This has resulted in substantial savings each time the material is handled and has increased warehouse capacity by permitting high tiering. But bags not on pallets when they arrive must first be palletized—an operation requiring about 14 hours per car.

Step No. 2 is now under way. Arrangements are being made with all suppliers of bagged materials, to ship in unit loads, on pallets. Such carloads can be completely unloaded and stored in not much over two hours—as against 14 hours for palletizing alone. Since no individual man-handling of bags is required, heavy labor is eliminated, and damage from handling and shipping is minimized. Comparable savings are realized by suppliers at the shipping end, making it possible to improve deliveries.

Savings possible by complete palletization are demonstrated at the same plant in the case of shipping cartons. For these, which arrive in "knock-down" condition, the company furnishes the supplier with special four-way pallets—and the "flats" arrive in unit loads strapped to these pallets. Unloading and warehousing now takes about three hours per car, where formerly, when "flats" were received unpalletized, it took 24 man-hours for the job.

Let a Baker Material Handling Engineer show you how you can save money with fork trucks and pallets.

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a temperature range of 68 to 104 deg. F. The remainder is desorbed slowly.

Composition of gases varies with storage time of dried milk in air. In freshly made products the oxygen concentration is greater than in air, and carbon dioxide concentration is very low. In older products, oxygen concentration is only slighter greater than in air, and carbon dioxide concentration is greater than can be accounted for if the gases are occluded air. A large part of the oxygen can be removed by successive evacuations, with intervening periods of several days.

Digest from "The Removal of the Sorbed Gases in Dried Milks," by H. S. Haller and J. E. Holm, *Journal of Dairy Science*, vol. 30, No. 3, 197-208, March, 1947.

ENGINEERING

Precooling Vegetables

TEMPERATURE of fruits and vegetables has a marked effect upon respiration, in which oxygen is combined with sugar to break it down into CO_2 and water, with a liberation of heat. An increase of 2½- to 3-fold for respiration is not uncommon for an 18-deg. rise in temperature in the range of 32-80 deg. F. Precooling after harvesting offers a means of checking this respiration and the harm that it does through depletion of sugar. The activity of microorganisms that attack fruits and vegetables is also greatly checked by precooling. Curves and data are included on vital heat, respiration at different temperatures and effect of temperature on loss of sugar.

Digest from "The Biological Aspect of Precooling Fruits and Vegetables," by W. T. Pentzer, *Refrigeration Engineering*, vol. 53, 511-513, 556, June, 1947.

Improved Coring Device

MODIFICATIONS of a coring device previously disclosed in patent 2,252,951 are the subject of a recently issued patent. Improvements have been made in the operation of the coring knife, in the firm positioning of the fruit or vegetable to be cored, and of the impact of the coring head thereon. As in the previously patented machine, tomatoes, for example, are placed in circular pockets on a conveyor moving toward the coring station where the coring and positioning devices are lowered to the tomato, and the core is removed as the device moves longitudinally with the tomato. A gaging bracket predetermines the

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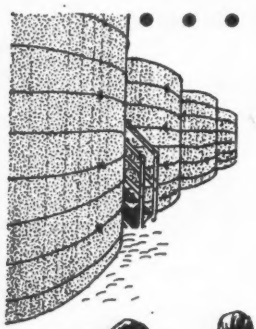

FOOD PROCESSING EQUIPMENT *A Problem?*

Tidewater RED CYPRESS

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A PROVEN FACT: Tidewater Red Cypress does not impart odor, taste, or discoloration to food with which it is brought into contact. This fact alone makes it ideal for such items as fermenting vats, processing tables, churns, pickle containers, etc.

A PLUS VALUE: This outstanding wood also offers extraordinary resistance to deterioration when used under adverse conditions such as extreme dampness, heat, etc.

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depth of penetration of the coring knife. Cores removed by the knife are thrown tangentially as the knife rises, and cored tomatoes are discharged into a chute.

Digest from U. S. Patent 2,414,493, issued January 21, 1947, on an application dated January 13, 1943, to William E. Urschel, Joe Richard Urschel, and Gerald W. Urschel, Valparaiso, Ind.

CEREAL PRODUCTS

Oat Pudding

AN OAT flour pudding composition which, when heated with milk or water, makes a pudding that is free of gum characteristics and gives a clean break when cut with a spoon, is the object of a recent patent. Basically, the composition consists of a mixture of 1-part rennet to 300-3,000 parts oat flour. Other ingredients that may be included are: $CaCl_2$; a sugar; NaCl; an edible gum and dried milk.

Digest from U. S. Patent 2,418,847, issued April 15, 1947, on an application dated April 19, 1945, to Sidney Musher, New York, N. Y., and assigned to Musher Foundation, New York.

MISCELLANEOUS

Preserving Coffee Flavor

FLAVOR of roasted coffee is preserved and development of off flavors prevented by the addition of from 0.3 to 3.0 percent lithium carbonate, according to the claim of a recently granted patent. The preservative should be present as soon as the coffee is ground. By including the admixture, coffee will retain a satisfactory and fresh flavor for at least a year in oiled paper bags, it is claimed.

Digest from U. S. Patent 2,419,031, issued April 15, 1947, on an application dated Oct. 5, 1944, to Frederick Pollack, Kew Gardens, N. Y.

New Milk Carton

A CARTON for delivery of milk, provided with a cream chamber and a valve for controlling an opening between the milk and cream chambers, is the subject of a recent patent.

The valve consists of a slotted disc, mounted in wiping contact with the bottom of the cream chamber, which may be rotated from an open to a closed position with respect to openings in this wall. The disc is attached to a shaft that extends from the bottom to the top of the cream chamber, and is actuated by a special knob that fits into a longitudinal slot in the top of this

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You'd expect a big sales-plus from cartons of *Coated* Lithwite . . . the board that's *clay-coated* . . . PLUS! 89 years of papermaking know-how produces the first plus . . . a high quality base stock that is exactingly level.

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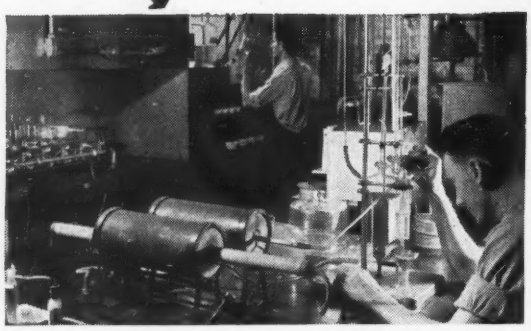
From selection of Raw Materials ...to Final Assembly



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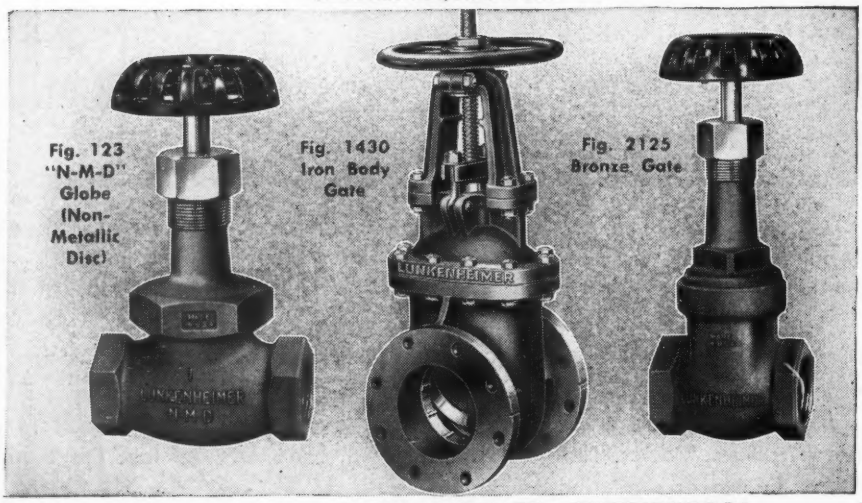

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shaft. When a carton is filled the valve is in the open position. To dispense cream only the consumer closes the valve, opens a pouring spout in one corner of the top, and pours off the cream. After the cream is removed the valve is opened to allow the milk to pass through as desired.

Digest from U. S. Patent 2,413,845, issued Jan. 7, 1947, on an application dated June 27, 1945, to Arthur Read, Portland, Ore.

Defeathering Fowls

MECHANICAL plucking of fowls by means of water sprays is the object of a recently patented process. A fowl is vertically suspended head downward in a frame and held in outstretched position by means of grips that hold the head, wings, and feet. The frame is rotated on its vertical axis between water pipes which are fitted with nozzles directed downward so that jets of water will strike the fowl against the grain of the feathers. In operation, the fowl is subjected to a spray of hot water at 75 lb. pressure in order to soften the feather follicles, followed by jets of water at about 85 deg. F. and 150 lb. pressure. Practically all the feathers may thus be removed.

Digest from U. S. Patent 2,412,338, issued December 10, 1946, on an application dated April 17, 1945, to Lenus Jasper, Orland, Calif., and assigned to Seth S. Barker, Ottumwa, Iowa.

Treatment of Potatoes

PREVENTION of decay and improvement of appearance of potatoes is the object of a recently patented process. It is especially useful in the treatment of White Rose potatoes grown in Cailfornia and harvested when only partly matured. At that time the potato skin is thin and easily rubbed off, to the detriment of its appearance. The method involves two successive treatments with different chemical agents. The first is sodium hypochlorite in a solution containing 2 percent available chlorine for a treatment lasting 30 sec., or 1 percent for one min. This agent acts as a detergent, fungicide, and bleacher, with accompanying oxidation. The second agent is sodium bisulphite, applied as a 0.25-1.0 percent solution for 5-15 sec., acting as a reducing agent. The process is preferably continuous on a stream of potatoes conveyed through different pieces of equipment in series.

Digest from U. S. Patent 2,417,932, issued March 25, 1947, on an application dated June 19, 1943, to Arthur F. Kalmar, Riverside, Calif., and assigned to Food Machinery Corp., San Jose, Calif.

BOOKS

Sugar Molds

CHEMICAL COMPOUNDS FORMED FROM SUGARS BY MOLDS. By Bernard S. Gould. Published by Sugar Research Foundation, Inc., 52 Wall St., New York 5, N. Y. 17 pages; 13¾x8½ in.; paper. Free.

This is the most recent of a series of reports issued by the Sugar Research Foundation, during the past two years. It presents summaries, in tabular form, of the metabolic products produced from glucose or sucrose by the more common Zygomycetes, Mucor and Rhizopus, the Imperfect Fungi, Aspergillus, Penicillium, Fusarium, Alternaria and Helminthosporium. Only representative species that produce a particular product are used. The approximate yields indicate the quantitative significance of the product with respect to the amount of sugar metabolized.

The food chemist, through such biochemical studies as these, may find answers to many of his present problems, not only in waste disposal, but in the discovery of valuable by-products.

Food Research

RESEARCH AND THE SCIENCE OF NUTRITION. Published by the Nutrition Foundation, Chrysler Bldg., New York 17, N. Y. 62 pages; 6x9 in.; paper. Free.

This is an extended report on the food industry's own research foundation. The booklet gives a short history of the foundation along with the aims that have motivated its activities since its founding in 1941. The developments resulting from the grants-in-aid are outlined and form the major portion of the volume.

Cereal Science

MODERN CEREAL CHEMISTRY. By D. W. Kent-Jones and A. J. Amos. Published by The Northern Publishing Co., Ltd., 37 Victoria St., Liverpool 1, England, 1947. 651 pages; 6¼x 10 in.; cloth. Price, 50 shillings.

This fourth and largest edition of a work first published in 1924, has been eagerly awaited by English speaking cereal chemists on both sides of the Atlantic. The great advance made in this science since the appearance of the last edition, in 1939, demanded the preparation of a new edition. At the same time, the physical difficulties imposed by the war made the task too heavy for one person. For that reason, the book appears for the first time under a joint authorship.

In presenting the overall aspects of cereal science, the book has been completely rewritten. Not only are most of the wartime developments included, but many chapters have been extended and wider scope has been given to cereals other than wheat. At least one entirely new chapter has been introduced on the assay of the vitamin content of cereal and cereal products.

The miller, baker, confectioner and brewer, as well as the cereal chemist, will find many of the chapters informative reading.

Labor Directory

WHO'S WHO IN LABOR. Published by The Dryden Press, Inc., 386 Fourth Ave., New York 16, N. Y. 480 pages; 8¾x11¼ in.; cloth. Price, $12.

With the rise of labor and labor leaders to positions of great industrial importance, this volume may prove of value to many labor relations directors in the food industry. It concludes a chronology of labor legislation up to May, 1943, along with the constitution of the AFL and the CIO.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue.

AGRICULTURAL, PASTORAL, AND FOREST INDUSTRIES IN ARGENTINA. U. S. Tariff Commission. Unnumbered. Price 25 cents.

AGRICULTURAL, PASTORAL, AND FOREST INDUSTRIES IN CUBA. U. S. Tariff Commission. Unnumbered. Price 20 cents.

ECONOMIC CONTROLS AND COMMERCIAL POLICY IN NICARAGUA. U. S. Tariff Commission. Unnumbered. Price 10 cents.

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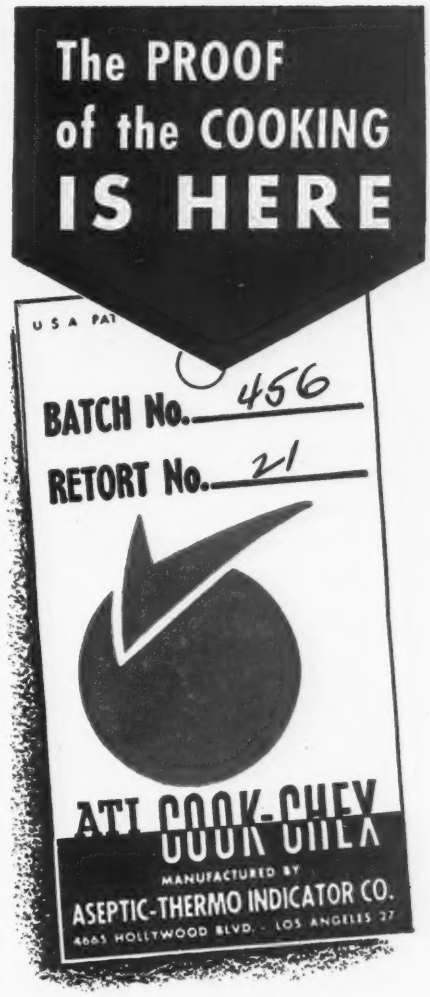

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On RAPIDS-STANDARD CONVEYORS

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SPEEDED PRODUCTION AS HIGH AS 75%

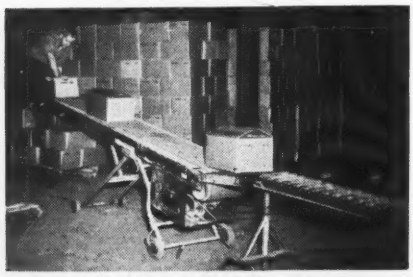
Installation of a Rapids-Standard Conveyor System speeded production as high as 75%, and made it

(B) Floor-Veyor carries empty cans and cartons to second floor packing department.

possible to handle greater quantities in far less time and with less labor. It effected considerable savings in waste and spoilage.

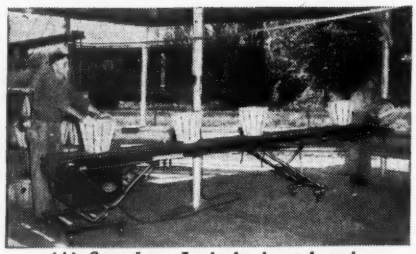
EQUIPMENT PAYS FOR ITSELF IN ONE SEASON

The Owner of the Cannery had this to say about his Rapids-Standard Conveyors: "The equipment we have is doing a wonderful job; I don't see how it would be possible for any



(C) Cartons are stacked with the help of a Stevedore, Jr. in elevated position.

*Name sent on request.

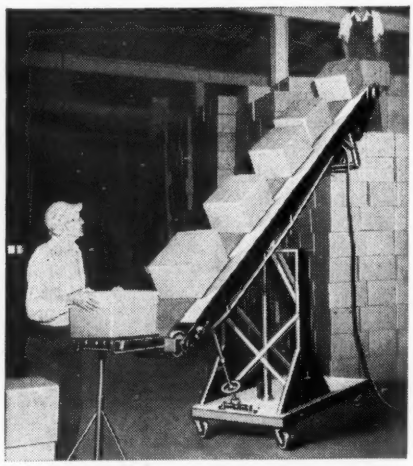


(A) Stevedore, Jr. in horizontal position moves baskets of tomatoes from truck to trough.

canning company to be without it. There isn't a piece of handling equipment in the place that hasn't paid for itself in one season." This is a strong statement in-as-much as their season lasts only two months.

HOW THE SYSTEM WORKS

A Stevedore, Jr.—Portable Power Belt Conveyor—(A) moves baskets of tomatoes from trucks to a trough



(D) Canned and boxed tomatoes are stacked with the help of a Rapid-Power Booster.

which carries the tomatoes inside the plant. Empty cartons and cans are moved from truck to the second floor packing department on Rapid-Wheel Gravity Conveyors and a Floor-Veyor (B). A Stevedore, Jr. helps to stack the empties on the second floor (C). Filled cartons are moved on Rapid-Wheel Conveyor to the warehouse where the Rapid-Power Booster (D) stacks them speedily and efficiently.

For further information, write the Rapids-Standard Co., Inc., 361 Peoples National Bank Bldg., Grand Rapids 2, Michigan.

PRODUCTS ON WHICH THE UNITED STATES WILL CONSIDER TARIFF CONCESSIONS IN CURRENT TRADE AGREEMENT NEGOTIATIONS. U. S. Tariff Commission. Unnumbered, mimeographed.

RELATION OF THE SUGGESTED INTERNATIONAL TRADE ORGANIZATION CHARTER TO UNITED STATES AGRICULTURAL PROGRAMS. U. S. Tariff Commission. Mimeographed, unnumbered.

PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN. Part 14, Surface Water Supply of the United States, 1945. Geological Survey Water-Supply Paper 1044. Price 50 cents.

OPERATIONS OF CONSUMERS' COOPERATIVES IN 1945. Bureau of Labor Statistics, Bulletin 890. Price 10 cents.

FEDERAL LABOR LAWS AND AGENCIES. A Guide for Shop Stewards and Supervisors. Department of Labor, Division of Labor Standards, Bulletin 79. Price 20 cents.

FEDERAL AND STATE STANDARDS FOR THE COMPOSITION OF MILK PRODUCTS. Bureau of Dairy Industry, BDIM-Inf-45. Mimeographed.

PEANUT STOCKS AND PROCESSING, SEPTEMBER 1945—AUGUST 1946 SEASON. Bureau of Agricultural Economics. Unnumbered, mimeographed.

FARM PRODUCTION, FARM DISPOSITION, AND VALUE OF PRINCIPAL CROPS, 1945-1946, BY STATES. Bureau of Agricultural Economics. Unnumbered, processed.

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MARKETING MARGINS AND COSTS FOR LIVESTOCK AND MEAT. By Knute Bjorka. Department of Agriculture. Technical Bulletin No. 932. Price 25 cents.

INEXPENSIVE REPLACEMENT ELEMENTS FOR LABORATORY HOT PLATES. By Harold W. Rusk. Bureau of Entomology and Plant Quarantine, ET-235. Mimeographed.

U. S. NAVY MANUAL OF SAFETY EQUIPMENT. Navy Department. Price, $1.

INSECTICIDE DUSTER. By R. D. Chisholm, et al. Bureau of Entomology and Plant Quarantine, ET-237. Mimeographed.

STANDARD SAMPLES ISSUED OR IN PREPARATION BY THE NATIONAL BUREAU OF STANDARDS. Circular C398 (supplement). Available free on request from the National Bureau of Standards, Washington 25, D. C.

PATENTS

Butter Made to Contain Not More Than 5 Percent Water—Jakob L. Jakobsen, Minneapolis, Minn., to General Mills, Inc. No. 2,418,645. April 8, 1947.

Vegetable Oil Winterized by Addition of Colloidally Dispersed Aluminum Tristearate—Harvey D. Royce, to The Southern Cotton Oil Co., Savannah, Ga. No. 2,418,668. April 8, 1947.

Wheat Starch Slurry Treated With From 0.25 to 3.0 Percent Water-Soluble Metal Nitrite to Aid Separation From Gluten—Richard H. Schilling, Minneapolis, Minn. to General Mills, Inc. No. 2,418,669. April 8, 1947.

Centrifugal Purification of Sugar Improved by Intermittent Washing Periods of Predetermined Length—Frederick W. Kopplin, Hardin, Mont. No. 2,418,776. April 8, 1947.

Apples Pared and Cored During Travel Through Circuit While Rotating in Contact With Knife—John F. Lindner, Noval, Ontario, Canada. No. 2,418,805. April 8, 1947.

Castor Oil Treated for Removal of Free Fatty Acid by Neutralization and Addition of Fuller's Earth Preliminary to Separation Into Oil and Soap Stock Including Absorbed Material—George F. Coggins, New Bedford and John Francis Ahearn, Reading, Mass. to Aerovox Corp., New Bedford, Mass. No. 2,418,819. April 15, 1947.

Pudding Mix Made From Oat Flour and Rennet—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,418,847. April 15, 1947.

Pectinates Formed From Pectin Having Methoxyl Content of From 8 to 11 Percent—Edwin F. Bryant, Corona, Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,418,865. April 15, 1947.

Alkaline Earth Pectinate Prepared From Pectin Having Methoxyl Content Below 8 Percent—Edwin F. Bryant, Corona, Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,418,866. April 15, 1947.

Glyceride and Lower Alkyl Ester of Different Fatty Acid Interchanged by Subjecting Glyceride in Liquid Form to Vapors of Ester to Be Injected Into Glyceride—John Francis Murphy, Fitchburg and Ernest K. Holt, Arlington, Mass. to Lever Brothers Co., Cambridge, Mass. No. 2,418,898. April 15, 1947.

Meat Tenderized by Combination Mechanical and Chemical Treatment—Vladimir Leslie Tichy, Cleveland, Ohio. No. 2,418,914. April 15, 1947.

Mixture of Oxalic and Tartaric Acids in Solution Separated by Formation of Calcium Salts—Ralph A. Hales, West Chester, Pa., to Atlas Powder Co., Wilmington, Del. No. 2,419,020. April 15, 1947.

Carbohydrates Oxidized to Tartaric Acid by Continuous Process—Ralph A. Hales, West Chester, Pa. to Atlas Powder Co., Wilmington, Del. No. 2,419,019. April 15, 1947.

Roasted Ground Coffee Stabilized in Flavor by Addition of 0.3 to 3.0 Percent of Lithium Carbonate—Frederick Pollack, Kew Gardens, N. Y. No. 2,419,031. April 15, 1947.

Tartaric and Oxalic Acids Made From Carbohydrates by Cyclic Process—Marshall T. Sanders, Brandywine Hundred, Del. to Atlas Powder Co., Wilmington, Del. No. 2,419,038. April 15, 1947.

Meat Stored Under Controlled Temperature and Humidity Conditions—Paul B. Christensen, Fair Lawn, N. J. to Westinghouse Electric Corp. No. 2,419,119. April 15, 1947.

Vanillin Converted Into Vanillic Acid by Treatment With Alkali Hydroxide and Silver Oxide in Water—Irwin A. Pearl, to Sulphite Products Corp., Appleton, Wis. No. 2,419,158. April 15, 1947.

Cassava Starch and Wheat Flour Used in Vegetable Glue Mix With Wheat Flour Comprising From 25 to 65 Percent of Total Starch and Flour Content—Gordon G. Pierson, to Perkins Glue Co., Lansdale, Pa. No. 2,419,160. April 15, 1947.

Crude Glutamic Acid Obtained From Hydrolysis of Proteins Purified by Treatment With Small Amount of Oxidizing Agent and Heating Not to Exceed 85 Deg. C. — Herman W. Dorn, Toledo, Ohio to International Minerals & Chemical Corp. No. 2,419,256. April 22, 1947.

Fruit Juice Aromatics Distilled Off Preliminary to Fermentation of Juice and Replaced After Fermentation Has Ceased.—William A Rooker, to National Fruit Products Co., Inc., Winchester, Va. No. 2,419,286. April 22, 1947.

Fish Mechanically Positioned and Held in Fixed Position for Transfer to Next Station on Processing Line—Charles M. Savrda, Bay Shore, N. Y. and William H. Hunt, National City, Calif. to Atlantic Coast Fisheries Co., New York, N. Y. No. 2,419,289. April 22, 1947.

Juices Separated From Pulp in Centrifugal Extractor Comprising Rotatable Cylinder Fitted With Encircling Groove Circumscribing Cylinder in Excess of Ten Times and Encircling Rotatable Straining Screen—Herbert Edward Gray and Arvid Manuel Erickson to Barron-Gray Packing Co., San Jose, Calif. No. 2,419,545. April 29, 1947.

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HOW TO SEPARATE A CAT FROM A MOUSE

● Simply a matter of screening . . . a useful trick for a mouse to know. In fact, screening is a useful trick in any trade. . . . even the salt business!

You see, in the salt business we've got to fit the salt to the job. Butter-makers don't want large, slow-dissolving crystals in Butter Salt. We remove the "big ones" so completely, you won't find even a trace on a 28-mesh Tylor screen. But they don't want fine dust, either, to cause pasting in the churn. Diamond Crystal Butter Salt contains only 3% of particles small enough to pass through a 65-mesh screen!

Yes, it's as vital to the butter-maker that we remove over-sized and under-sized salt crystals . . . as it is to the mouse to screen out that cat. (Well, *almost* as vital!)

Happily for the mouse, he got results. And so do we at Diamond Crystal. That's why you can always be sure of clean screening whenever you specify Diamond Crystal. Take your choice of grade or grain size — it's tops by actual tests!

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There's nothing complicated or mysterious about the construction or value of Hamilton kettles, but at every point they show knowledge of food men's needs and the skills that alone can produce such good equipment. No finer kettles are made—none are a better investment. No other kettle will stand up longer for less per day.

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THE HEART OF FOOD PROCESSING

EVERY TYPE OF FOOD KETTLE

Hamilton Mix - Cookers and kettles of all types are fabricated in all metals and in any size, standard in design or engineered to the job. Our heavy production brings costs down.

Send for descriptive Hamilton Kettle Bulletins. Describe the mixing or cooking job to be done. We'll recommend properly engineered equipment.

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Hamilton Mix-Cookers and all other Hamilton kettles are made only by Hamilton Copper & Brass Works, Inc., Hamilton 2, Ohio. EST. 1876

THE KETTLE WITH THE **HAMILTON** NAME

Testing Filter Pads

(*Continued from page* 101)

is about half-filled with gas. When the broth is clear after 24 hours, it is likely that results will be negative. Absence of growth indicates that the filter pads will provide sterile filtration.

If only one test is to be made, the entire apparatus is placed in the incubator. If more than one test is to be made and only one laboratory filter is available, then the filter is removed, the mouth of the flask is stopped with sterile cotton and the flask is placed in the incubator. These transfers, however, must be made aseptically.

Filter press and plant installation photographs in this article were supplied by F. R. Hormann and Co. Press, equipped with two exchange heads, is made up with 13 coarse pads for preliminary filtration, five denser pads for polishing, and five germproof pads.—The Editors.

—End—

Thermophiles

(*Continued from page* 96)

fresh water flooding treatment with machinery in motion for at least 24 hours.

Pumps—Pumps used for starchy or hot materials should be dismantled, scrubbed, soaked in cold water overnight, and scrubbed and flushed before use the following morning.

Quality Graders—As normally operated, quality grader temperatures are low; but in no event should the temperature be allowed to rise above 100 deg. F. Brine solution should be changed frequently. The graders should be left clean, cold and empty overnight.

Washers—Too little attention is paid to washers in the cleanup. Heavy bristle or wire brushes should be used to dislodge adhering particles of vegetables. The load during operation should not be so heavy that sprays miss the bottom layer of the product. Sprays should be cleaned out daily, particularly in hard water areas. Water should not be recirculated under any condition, and hot water washes should be avoided.

For the sealed can, four "don'ts" will minimize spoilage from the thermophiles:

1. Don't hold a hot sealed can for an unusually long period prior to retorting.
2. Don't "cut corners" on retorting.
3. Don't undercool.

Delicious! Because a Shellmar container keeps them "Flavor-Lock'd"

When the Richmond-Chase Company developed a delightful new prune product, pre-cooked under pressure, they likewise developed a need for an unusual package. Shellmar engineers met the problem with a triple laminated and coated pouch which seals in all the original goodness and moisture of the product. If *yours* is an unusual product requiring an unusual package, contact your nearest Shellmar office.

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THE *extra* space you looked for down the length and across the width of your warehouse, the Crescent PALLETIER finds high above the floor. With the reach of a giant, the PALLETIER stacks pallet loads to the rafters. It may double your storage capacity... save the cost of a new building.

Hour after hour, the Crescent PALLETIER lifts, totes, tiers, climbs ramps, speeds loading and unloading ... shrinks handling time and costs.

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ONLY *Crescent* HAS ALL 5

- **Full Magnetic Contactor Control** protects against forced acceleration—extends life of motor and tires.
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4. Don't store in overheated warehouses, directly under metal roofs, or next to the boiler room.

Summary

Briefly summarizing the problem, we find that thermophiles are bacteria which may cause spoilage in canned non-acid vegetables at high temperatures. They are found in the raw product and in added ingredients, and will multiply rapidly in hot plant equipment and in an improperly handled sealed can. Though they cannot be kept out of the plant, they may be controlled by keeping the product and equipment temperatures too low or too high for their growth, and by keeping plant equipment free from dirt accumulation.

—End—

New Labor Law

(*Continued from page* 73)

each employee a *written* assignment.

Agricultural Workers

Some 250,000 agricultural workers, employed in canneries and packing sheds, are exempt in the new law as they were under the Wagner Act. There is, however, no attempt made to define agricultural workers as was the case in the expiring law. In recent years appropriations for NLRB have specified that the board must follow the definition of agricultural labor as set forth in the Wage-Hour law. That will continue to be the case where appropriations carry such limitations. Otherwise NLRB will consider itself free to use its own judgment as to what is an agricultural worker.

The law specifies the right of a worker to refrain from union activities. Even in a union shop the worker does not have to join a union before getting a job. More than half the workers must favor a union shop, and once a year 30 percent of the workers may petition for a new poll on the issue of rejecting the existing union shop or maintenance of membership contract.

Employers may not be forced to discharge a worker for violation of union rules, except for non-payment of dues. Neither may a worker be denied a job in a union shop for non-membership, if such membership was not made available to him on equal terms with other members.

For the Protection of Frozen Fruit Against Browning

Ascorbic-Citric Acid Mixtures

No. 4-96 and No. 8-92

● These double-purpose mixtures have been developed as the result of an extensive research program designed to reduce the cost of this protection.

The ascorbic acid component furnishes the actual protection while the citric acid inhibits the action of the enzymes naturally present in the fruit. It is these enzymes which normally speed up the destruction of the ascorbic acid by atmospheric oxygen, following which browning and flavor deterioration take place. With their activity reduced by the citric acid, there is a corresponding reduction in the amount of the comparatively expensive ascorbic acid required for protection.

The No. 4-96 mixture is designed for fruit low in acidity or which is to be packed in heavy syrup.

For fruit of higher acidity or which is packed in syrup of lower concentration, the No. 8-92 mixture should be used.

For further information please inquire of Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 West Grand Avenue, Chicago 10, Illinois; 605 Third Street, San Francisco 7, Calif.

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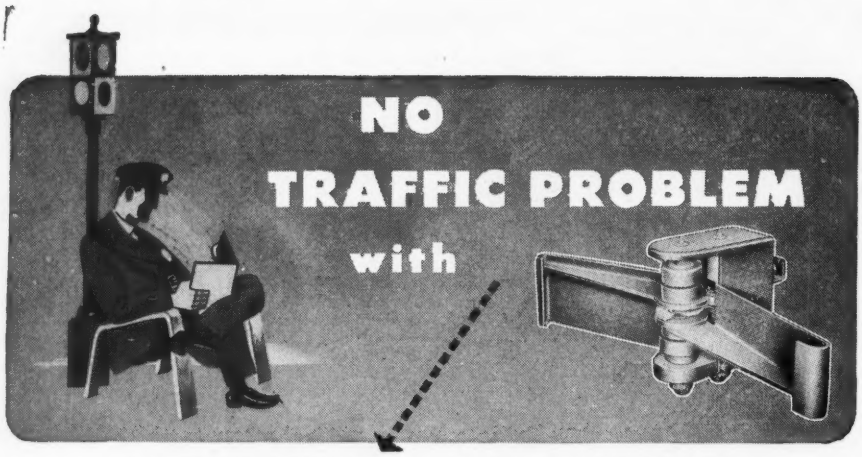

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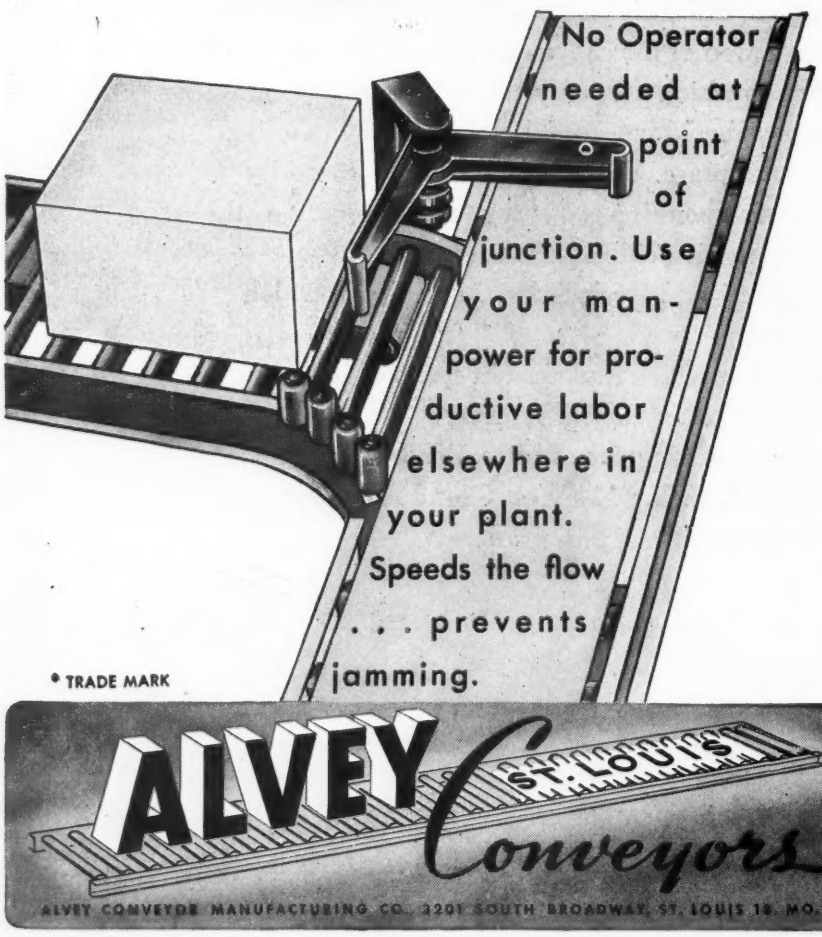
available only on ALVEYors*
"the word for every conveyor need"



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Thus NLRB can prevent discriminatory fees, Jim Crowism, etc.

Union welfare funds must be held in trust and their purpose specified in writing. And the fund must be jointly administered by management and the union.

Supervisors are broadly defined and their unions have no standing with NLRB. Management is under no obligation to deal with them in any way. This rules out a trend that could have had serious consequences had it been permitted to develop.

In order to adequately administer this new law, the National Labor Relations Board is increased from three to five members, the two new members to be appointed by the President for terms of five and two years respectively. But of far greater significance is the provision for a General Council, also to be appointed by the President. The law as it unfolds gives this office enormous power and in practice will make its occupant a true labor czar. It will be for him to decide whether charges are to be investigated and it will be for him to prosecute complaints before the Board. This leaves the Board with adjudicating powers only.

One of the little noted provisions, listed under the Board's investigatory powers, is the right to issue subpenas requiring, not only the testimony of witnesses, but the production of any evidence requested. This means the production of company books as well as those of the union involved and could conceivably give rise to many union fishing expeditions.

Mediation First

In an effort to settle issues between employers and employee representatives before they reach the stage of a major controversy, the Act creates an independent agency, the Federal Mediation and Conciliation Service. It will be the duty of the Service to urge and give every assistance in the settlement of such differences. There is also created a National Labor-Management Panel composed of 12 members—six each from the fields of management and labor. This Panel is to advise in the avoidance of industrial controversies as well as the manner in which mediation and voluntary adjustment is to be administered.

Teeth are placed in the Act by providing that employer or union may sue or be sued for violation of contracts. Furthermore any person convicted of violating any of the law's provisions will be guilty

FOR THE BEST IN PROTECTION

It isn't outer appearance that makes a policeman. It's the selection of the man, the years of training, the constant vigilance. Protective packaging is also more than mere outer appearance. It requires selection of a paper with the right basic qualities . . . one that can meet your needs exactly . . .and economically. That's why over 600 different Riegel Papers are used by leading firms in many fields. For protective papers . . . for special papers of any type . . . always consult Riegel first.

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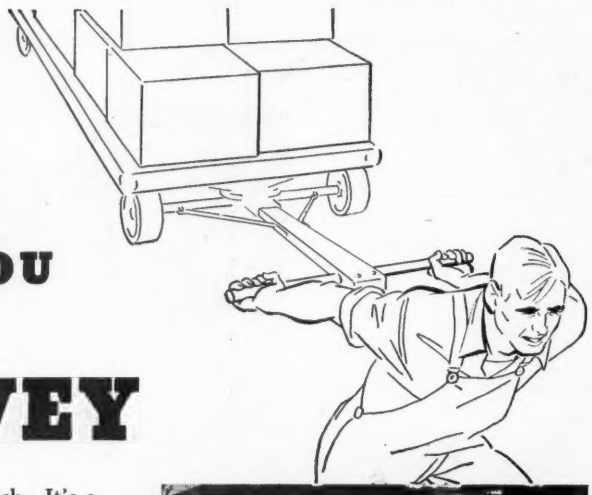

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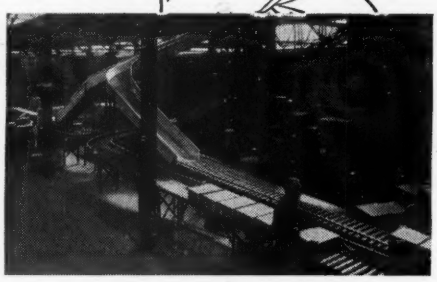
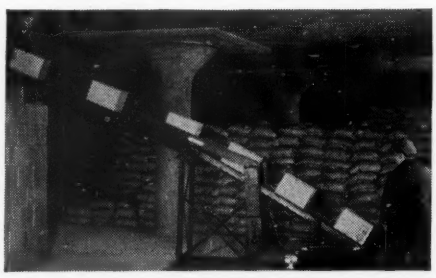


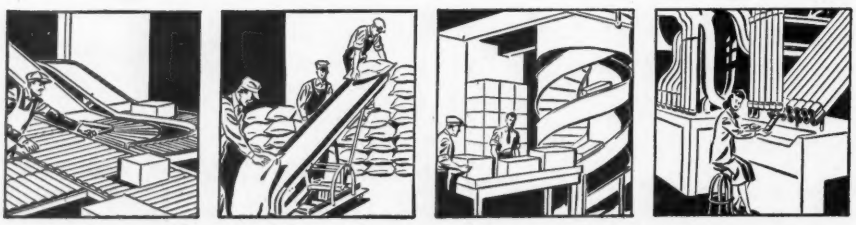
PRODUCTION LINES
Conveyors keep production moving without interruption.



WAREHOUSES
Handibelt portable conveyor helps pile cartons higher and faster in a warehouse.

LOADING PLATFORM
Cases move fast into cars on sectional roller conveyors — with less manual handling.

STANDARD Gravity and Power CONVEYORS



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of a misdemeanor and subject to a fine of not more than $10,000 or imprisonment for not more than one year, or both.

Those striving to achieve an impartial view of this law seem to agree that it is by no means the reactionary measure its opponents claimed it to be. There is a particular note of regret that the President, in his veto message, should have dealt so emotionally with an Act that he is now required to administer. By his manner rather than by his action, it is evident that Mr. Truman has added difficulties to an already difficult task.

—End—

Flavor Reversion

(*Continued from page* 107)

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—End—

Cranberry Sauce

(*Continued from page* 99)

sugar and pH conditions probably accounted for the decreased syneresis. All rapid-set, citrus pectins tried were satisfactory. Results were not uniform when rapid-set, apple pectin, or slow-set apple and citrus pectins were used.

The authors express their thanks for Howe and Early Blackberries

Artist – Richard Barnes, native of Iowa

IOWA—*annual purchases: $1¾ billion—mostly packaged.*

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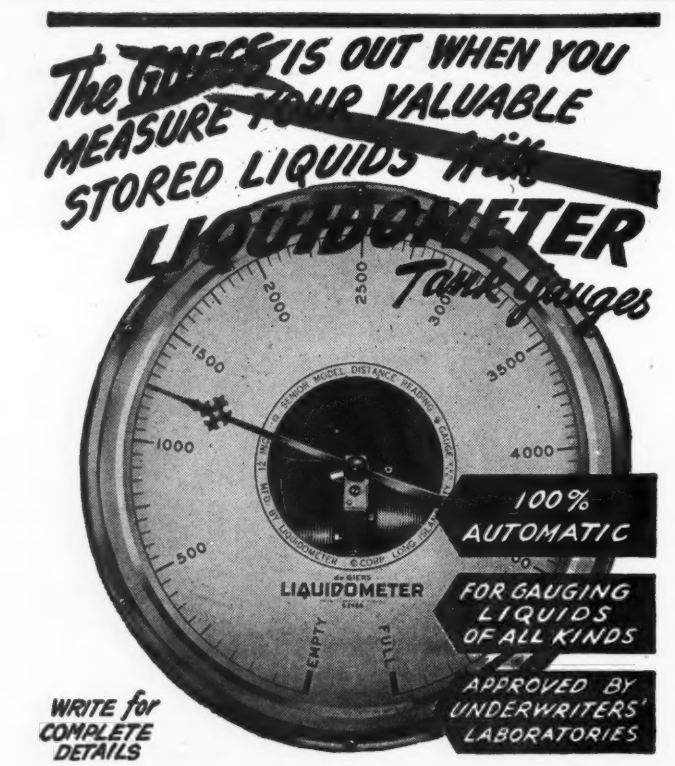

supplied by Cranberry Canners, Inc., Hansen, Mass., and some of the McFarlins by Susseman and Wormser Co., Redwood City, Calif.

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—End—

Packaging Laboratory

(*Continued from page* 104)

oil absorption and (13) thickness.

Common measurements include:

1. Basis Weight. Where a large sample is available, usually the most accurate and convenient method of determining ream weight is by means of a ream weight scale. Basis weight of paper is usually expressed as the weight in pounds contained in a ream (480, 500, or occasionally 1000 sheets of paper), a given size (24 in. x 36 in., or 25 in. x 40 in.). In the metric system, basis weight is expressed as the weight in grams of a sheet of paper one square meter in area. This is equivalent in pounds weight of a 500 sheet ream, each sheet about 35 in. x 40 in., or 35 in. x 42 in.

2. Tearing Strength. Many instruments are available to measure the force required to tear a paper. These instruments were designed and developed to substitute the hand tearing test. They measure the amount of force in grams required to tear a single sheet.

3. Opacity. Instruments are available to read either of two values, opacity or printing opacity. Opacity is the ratio of light reflected from a paper sample which is backed by a perfectly black body to that when the sample is backed by the white body. Printing opacity is the ratio of light reflected by a paper sample which is backed by a perfectly black body to that when the sample is backed by a stack of the same kind of paper.

4. Bursting Strength. An important test of the strength of paper or paper-board is bursting strength, or the pressure required to burst a paper, carton or container. It is chiefly

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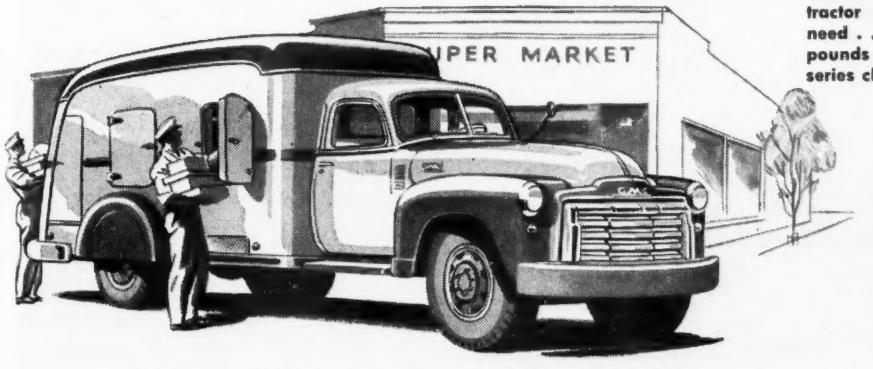

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Your Wyandotte Representative will tell you more about the advantages of Steri-Chlor and other Wyandotte products for each and every cleaning need in food-processing plants. Why not call him today?

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determined by the tensile strength and extensibility of papers, cartons and containers.

5. Air-Resistance or Porosity. Instruments known as densometers, porosimeters, and porosity testers, are used to determine the rate of flow of air through a paper of given dimensions under set standard conditions. Measurement of air-permeability of papers is important in determining the permeability of papers to volatile flavors and odors. Fresh vegetables, particularly, require wrapping materials with varying degrees of porosity. Air-tight packages do not permit "breathing." Consequently, a rapid breakdown takes place in the internal structure of some products. Porosity of carton end seals to be picked up one at a time from stacks by air suction on the packaging line can be measured. If seals are too porous, more than one seal may be picked up.

6. Smoothness. Instruments are used to measure the printing smoothness of papers.

7. Stiffness or Rigidity. A stiffness tester is used to measure the bending resistance of paper with and against the curl. This measurement is the stiffness, pliability, or "feel" of the paper. It is important where packaging machines operate at high speeds, since stiffness of papers influences the efficiency of the machines. If the paper is too stiff, it will not fold. On the other hand, if it is too limber, the package will not be guided properly into the packaging machine. The top lid on a carton may not close in a Peters carton closing machine, because the machine will not engage the lid to close it.

8. Thickness. The thickness of papers measured with micrometers, is expressed in thousandths of an inch.

9. Water and Oil Absorption. Sizing testers are used to determine the sizing of paper and paperboards, in terms of resistance to absorption of water and oils.

10. Stretch. Tensile strength is important in the case of wrapping papers, since papers may tear during tight wrapping.

11. Scuff Resistance. This is the property of a paper to resist wear due to contact with other surfaces.

12. Folding Endurance. Brittleness is important in some papers. Folding endurance relates to the number of times a paper can be folded before breaking. Tests are made under tension.

13. Water-Vapor Transmission. The General Foods water-vapor transmission cabinet is generally used to determine water-vapor transmission rates of packaging materials.

How Problems Are Handled

Problems channel through a packaging committee if the company is large. But even a small company should have two or three persons to steer the packaging policies. A

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To meet your requirements for complete—*specialized*—packaging . . . for speedy, economical and dependable nationwide service . . . Rossotti is prepared to cooperate in your packaging problems on both East and West coasts.

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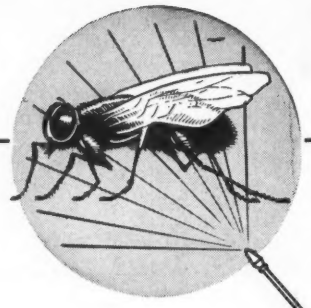

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LETHALAIRE, Virginia's deadly new aerosol insecticide, is made especially for large users. Lethalaire kills many different insects that plague public places, restaurants, factories, homes. It comes in a portable 5-lb. container-applicator that insures its correct and economical application.

A turn of the handwheel releases a circulating, self-propelled mist of fine insect-killing particles that remain suspended in the air for as long as half an hour. Each cylinder holds enough Lethalaire for 750,000 cu. ft. of space for flies . . . 1,250,000 cu. ft. for mosquitoes—enough for 125 applications for average use in a room 20′ x 30′ x 10′. Because the Lethalaire precision-engineered nozzle is scientifically designed, it generates a spray of correct particle sizes and meters the flow, preventing waste and insuring quick knock-down and high insect mortality.

Lethalaire is also available in a permanently installed system that will give you automatic insect control at the flick of a switch. Remember, wherever there are insects, the problem is BIG. Put your problem up to us and we'll show you what Lethalaire can do for you. Mail the coupon today for further interesting information about Lethalaire. A few territories are still open for dealers who call direct on users.

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committee meeting may be called every four to six weeks, and may last one to two days. A program is drawn up and issued to all, before the meeting. In this way problems to be considered are known ahead of time. Those attending the meeting are representatives from purchasing, merchandising, production, quality control and research and developments departments. In some plants the merchandising manager acts as the chairman of the meeting. Problems are brought up at the meeting and discussed. All receive a copy of the minutes of the meeting.

The chairman issues problems to the packaging laboratory together with: (1) A research project number, (2) a statement of the objective of the project, (3) recommendations relative to procedures to follow, (4) packaging material selections, (5) products to be packaged and (6) a problem priority listing.

Upon receipt of the projects, the head of the packaging laboratory assigns them to the staff (or in a very small laboratory he may do all the work himself). He assists in organizing and initiating problems. The head of the packaging laboratory attends packaging committee meetings, discusses problems with suppliers and follows up packaging developments in the food industry through visits.

Issuing Reports

Progress, project and service reports are issued by the packaging laboratory. The head of the laboratory submits reports monthly to executives in charge of sales, production, purchasing, quality control, chairman of the packaging committee, and research and development. These reports cover: (1) Packaging problems submitted, initiated and completed; (2) status of packaging developments; (3) project and service reports issued; (4) patent disclosures and applications made; (5) interviews with suppliers' sales and technical personnel and (6) visits to suppliers' plants. Specifications, conclusive statements and recommendations may be included.

Project reports are prepared by the personnel assigned to the project. Reports are then submitted by the head of the packaging laboratory to the department where the project originated, with carbon copies to the chairman of the packaging committee and the director of research and development. The reports may be written out on printed

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COMPARE IT PIECE BY PIECE

It will pay you to look inside the Walworth No. 225P. Compare the improved design, construction and convenience features shown in the "exploded" view. Notice the husky bronze body, the removable seat and disc, the oversize stem, all assuring maximum protection against wear and leakage.

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Available in both globe and angle types (angle type: No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas or air.

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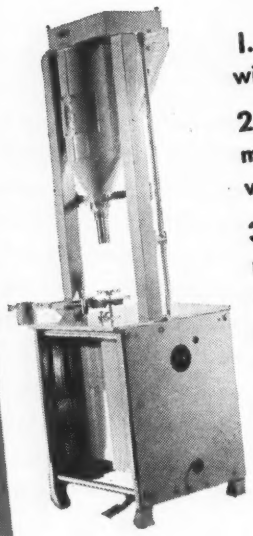

1. A gross weight scale with auger feed.
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forms. The report must be detailed and include: (1) Title, (2) project number, (3) product number, (4) object or purpose of the investigation, (5) list of packaging materials tested and manufacturer of the materials, (6) packaging equipment used, (7) experimental method used, (8) results obtained, (9) discussion of results, (10) conclusions and (11) recommendations.

Service reports are issued to a department or subsidiary in the company confronted with packaging difficulties, particularly with the use of a package or changes in packaging technics.

Setting Up Specifications

Packaging specifications include both performance and material specifications. They must be met by suppliers and made in terms easily understood. Copies of specifications must be submitted to purchasing and production departments and one copy must be kept on file in the laboratory.

Material specifications must cover the method of construction of the film, wrapper, carton, closure and metal or glass containers. For example, if aluminum foil is laminated to Cellophane or Pliofilm, thicknesses of the foil and film and type and amount of laminate must be specified.

Suppose veal kidneys were put up in an institutional package—about 30 lb.—with the kidneys individually wrapped and packed in a large carton containing an inner pouch. Then, material specification must be issued for the dimensions and construction of the carton, inner pouch and wrappers.

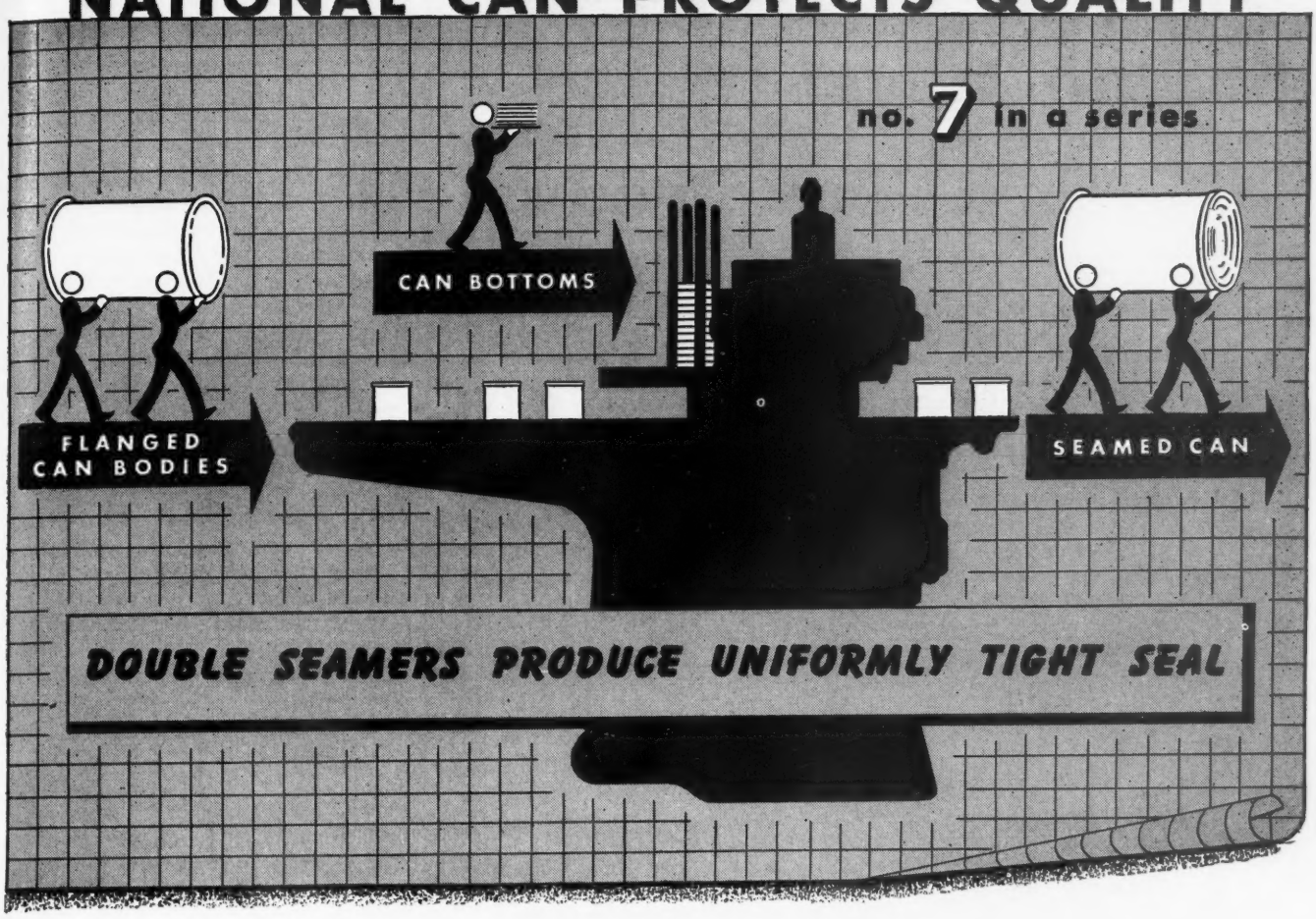
Performance Specifications

Performance specifications must include necessary physical characteristics, such as greaseproofness, ream weight, moisture-vapor permeability, gas permeability and tear strength.

If, for example, performance specifications must be set up for waxed paper liners for cartons, then it is necessary to include the following: (1) Total ream weight, (2) weight of base sheet, (3) weight of wax, (4) melting point of wax, (5) moisture-vapor transmission rate, (6) grease resistance, (7) appearance and (8) odor.

Suppliers and processors are guided by material and performance specifications. Maximum product protection and efficient packaging are assured when suppliers meet specifications, and the packaging laboratory makes routine checks periodically.

NATIONAL CAN PROTECTS QUALITY



As double seaming follows flanging, metal container manufacturing methods at National Can Corporation's plants show no letdown in either speed or accuracy. Again, at a rate in excess of 300 cans per minute when high speed equipment is used . . . again with the aid of automatic precision machines . . . extremely exacting standards of control are maintained.

The double seamer rolls or seams together the flanged end of a can body and a can bottom which has been made in separate sub-assembly. At National Can, greater preciseness goes hand in hand with high speeds. Two sets of balanced rollers (integral with the seaming head) engage the pre-curled can end across its diameter, resulting in an interlocking of end with body flange to a firm and continuous seal. As a result many thicknesses of metal (with a Latex liner binder) help to produce a uniformly tight seal.

These double seamers are "custom-built" — manufactured in National Can Corporation's machine shops, designed, constructed and supervised by the company's staff of engineers.

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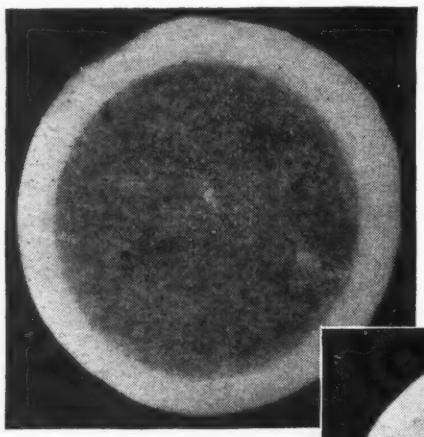
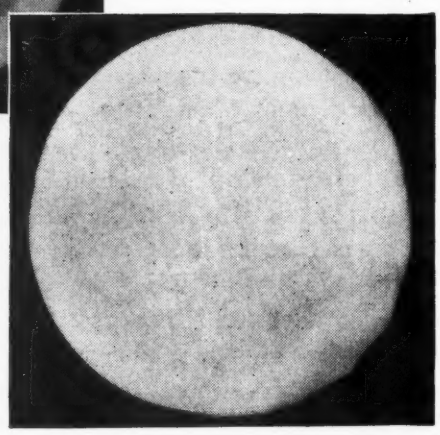
Sodium Benzoate is a Food Product

In addition to being U. S. P., Sodium Benzoate produced by Tennessee Products & Chemical Corporation is given the *pure milk sediment test* in order to assure absolute cleanliness and highest purity. *Examine these actual photographs:*



LEFT — ***Sediment from ordinary U. S. P. Sodium Benzoate.***



RIGHT — ***Sediment from Tennessee Products & Chemical Corp., U. S. P. Sodium Benzoate.***

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Food Spending

(*Continued from page* 112)

normal. Altogether, that's $12,000,000,000 of consumer income available for "excess" spending on other things. The rest that's not spent on food has found its way into clothing, liquors, restaurants, and a variety of other retail lines.

For it's important to note that since the last part of 1946—once OPA controls were killed—total consumer spending has kept in line with available income (after taxes). In short, the low spending on cars and rent has become high spending in other lines.

These "normal" spending patterns simply express the fact that in past years most types of spending moved closely with income. Dollars spent for food not only rise or fall when income does, but even by a fairly standard percentage. So do auto expenditures, and housing expenditures.

Drop of 15 Percent Seen

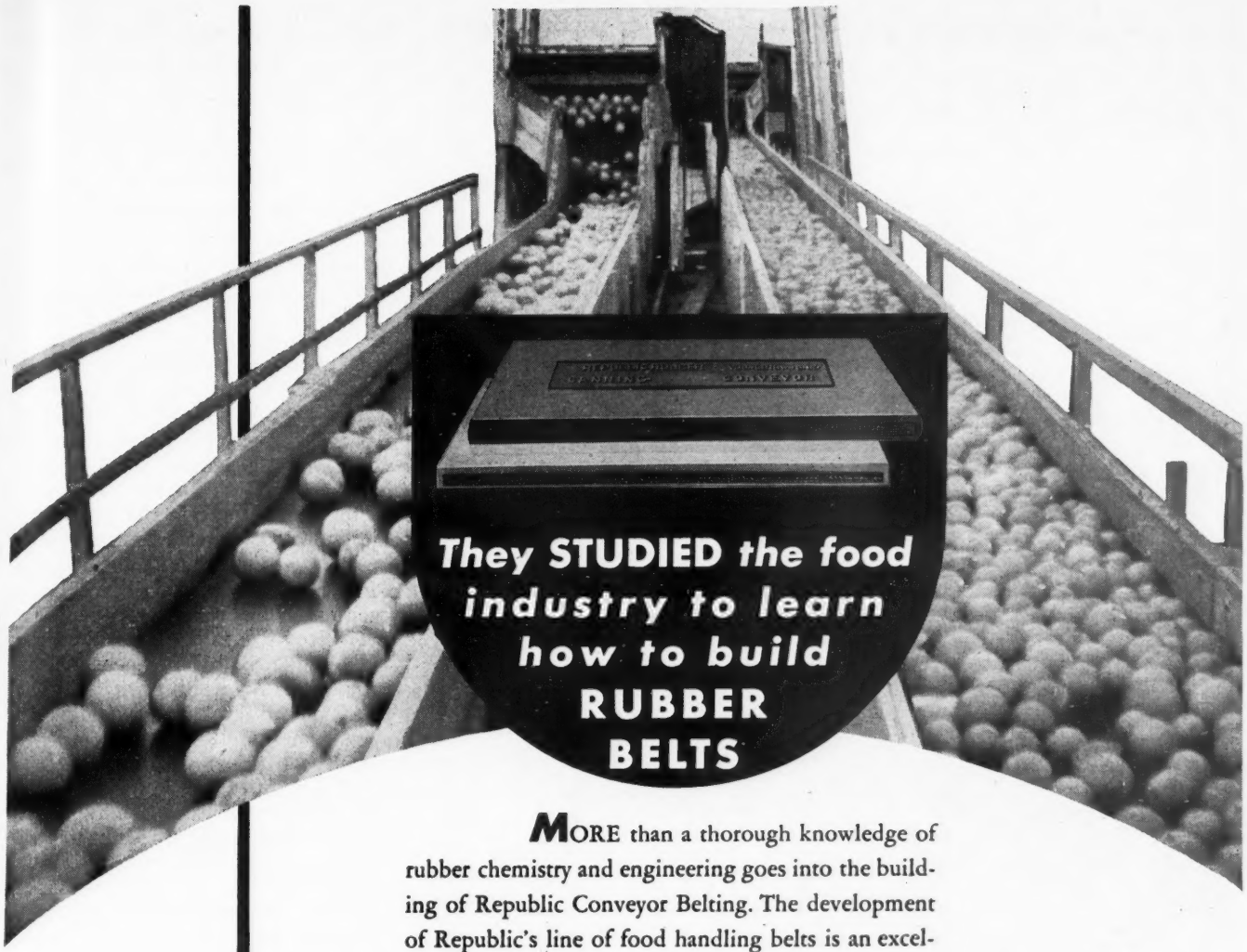
What's ahead? The same simple expenditure analysis tells us that dollars spent on food at retail may drop 15 percent or so in the next nine to twelve months. Reasons for such an expectation—which must be tentative for the present—break into two entirely separate parts.

The first has to do with coming changes in spending patterns. Automobile production is rising; it's fair to expect more dollars to be spent on cars in coming months. Similarly, completions of new homes are still increasing; obviously, their rental or purchase will absorb more consumer dollars. In addition, upward adjustments in rents are in sight. And you can look for more to go into consumer durables like refrigerators and sewing machines whose output is rising.

The second has to do with a recession in business. You can't tell just how far food dollars will shrink from changes in the ways consumers will spend their income. For their incomes may be declining too. That's the second part of the story —the business recession.

One cause for a recession is that the upswing in hard goods is forcing a price and production readjustment in such soft goods as ladies' apparel, liquors, and textiles. Another is that cost of home building apparently has risen higher than prices people are willing to pay. There are other reasons.

In any case, a recession is widely



They STUDIED the food industry to learn how to build RUBBER BELTS

MORE than a thorough knowledge of rubber chemistry and engineering goes into the building of Republic Conveyor Belting. The development of Republic's line of food handling belts is an excellent case in point. Republic's technologists made extensive surveys of actual operating conditions in canning and food processing plants. Specific requirements and all service factors were tabulated and carefully analyzed. Then, rubber compounds and belt constructions were developed to meet each particular need uncovered by this research. Subsequent experimentation and testing have kept Republic Conveyor Belts continuously in advance of Food Industry requirements . . . in the lead in their equipment class for long, superior service.

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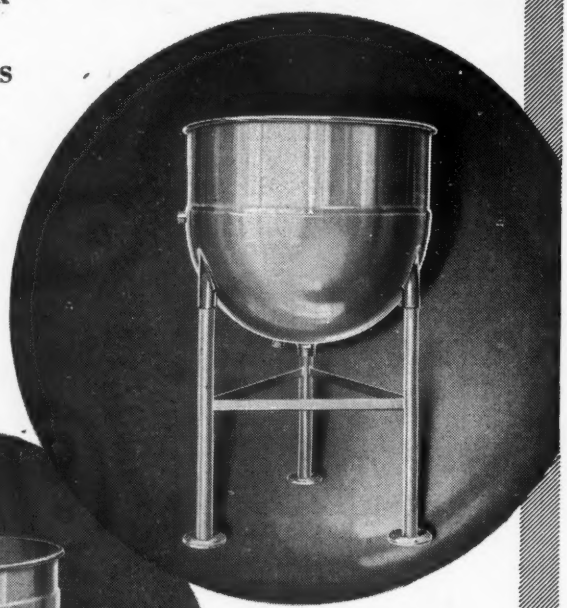

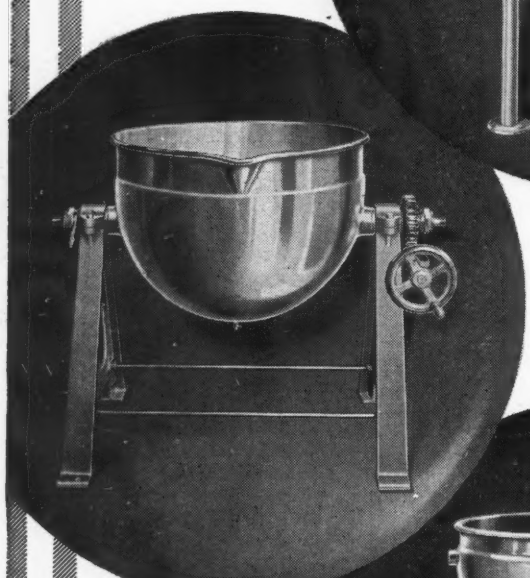

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discussed. It may have already started. If production goes down, employment will recede; and with diminished employment, payrolls would ease off. So the national market for foods, in dollars, would contract.

Recession Factor

The main question for all businessmen is how far such a recession may go. Economists' forecasts range all over the lot, to be sure. But the majority of them look for at most a 20 percent decline in consumer income, from the top of the recent boom to the bottom of the supposed recession. And many expect a good deal less of an income decline—perhaps as little as 10 percent. One factor they stress is the continued high level of federal expenditures, including forthcoming additional foreign aid. This will act as a cushion to business activity.

If income does go down, the lines like foods which have been enjoying abnormal spending will bear the brunt of the fall. For people would spend more for rents than they are doing even if over-all incomes ease off. And automakers, for example, are confident that consumers will go on buying new cars due to the wartime lack of four years' auto production. Hence the deficit of spending in those lines would automatically be reduced; and so would the excess of spending on things like food.

Taking both factors into account —the shift in spending patterns and the business recession—the statistics can be worked over for an estimate of the food dollar decline. Naturally, they make assumptions about car production and rent increases which cannot all be detailed.

Three Possibilities

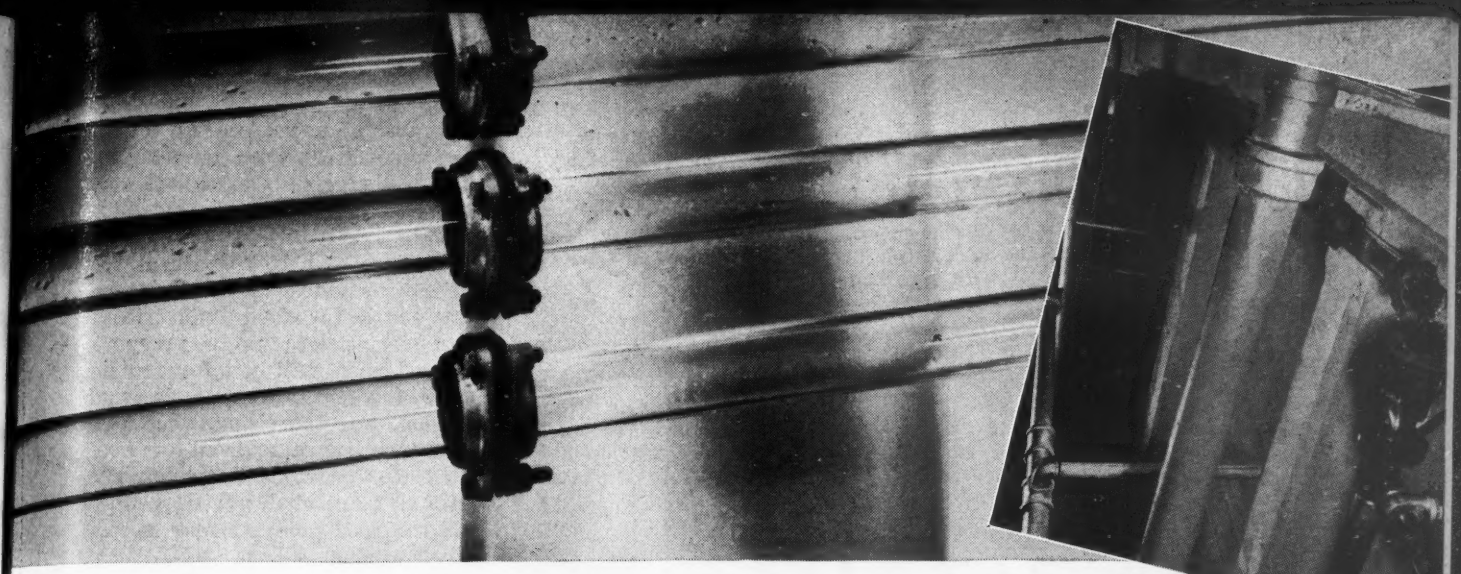
But here's the sort of arithmetic with which they come up, stated first as stark conclusions:

If income held up to recent levels, food dollars might fall 5 percent to 10 percent over the coming nine or twelve months.

If income decreased by 10 percent, food dollars might well fall 15-20 percent.

If income dropped by 20 percent, food spending might go down as much as 30 percent or more.

The second possibility probably hews closest to the line of coming events, if we take the less pessimistic economists at their word. The third extreme is probably ruled out by the fact that federal farm price supports would make it impossible for consumers to buy their food with one-third fewer



PYREX brand Glass Pipe shows no signs of wear

After 5 years of hot food acid service "We consider PYREX brand glass pipe to be unquestionably the best for food processing in every respect."

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THE RED WING CO., FREDONIA, N. Y.

Five years ago, The Red Wing Co., Fredonia, N. Y., one of the large packers of catsup, tomato juice, jams and jellies, made its first installation of PYREX brand glass pipe. Starting with a few short lengths for special purposes, PYREX pipe proved to be not only practical but possessed many special advantages. As a result, hundreds of feet of PYREX pipe now speed Red Wing products through this plant and additional lines are planned.

Increased sanitation is an important point since the liquid smooth surface of PYREX pipe is easily cleaned inside and out. Its transparency permits accurate visual inspection throughout at any time. The glass has a pleasing, modern and effective appearance that especially impresses visitors.

The resistivity of PYREX pipe to thermal shock also has been well demonstrated since in handling catsup, the lines are frequently flushed out with cold water before running hot catsup at temperatures up to 215°.

At the Red Wing Co., metal pipes were replaced frequently because of the corrosive action of hot food acids. After five years, PYREX pipe has shown no signs of wear and will last indefinitely. This means substantial savings that increase with each passing year.

PYREX brand glass pipe, ranging from 1½″ to 4″ I.D. is used at The Red Wing Co., Fredonia, N. Y. for transferring fruit juices, hot catsup, chili sauce, and other products. From an initial installation of a few pieces five years ago, Red Wing has installed hundreds of feet based on the many practical advantages PYREX pipe offers.

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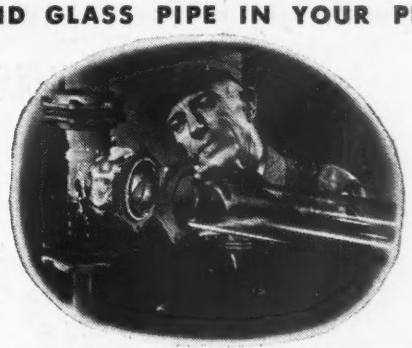

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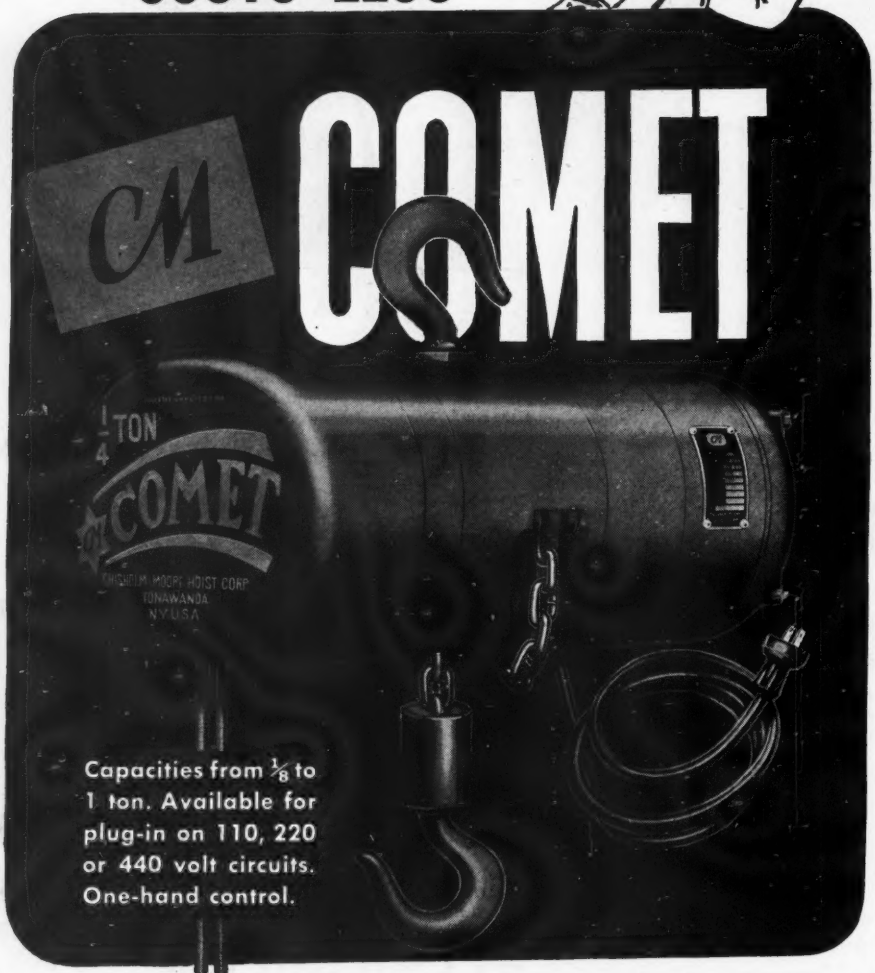

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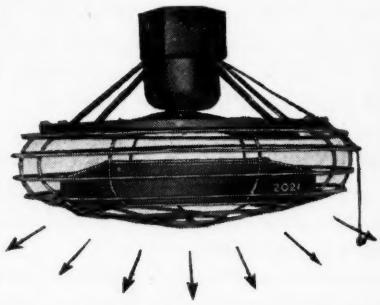
dollars than now. And as for the first possibility, we may assume that the experts who expect some recession in business cannot all be wrong.

A figure of a 15-20 percent food decline provides at least a first benchmark for food industries to measure against their prospects. The estimate will call for revision and refinement, of course, as events develop. For there's nothing legislated into federal or local law about the economic rules by which such estimates are made; food spending and the food business may not follow the book. All we know is that they have started to and probably will continue.

What such a 15 percent or 20 percent decline in food spending could mean for prices and production, line by line in the food trades, is a complicated story to unravel. It involves exports, crop prospects, inventories, and other aspects of the economics of eating. And each story is individual.

Evidence of the importance of weather, for example, is to be had in the way this year's wet spring has boosted corn prices, and this summer's floods have caused farmers to cancel commitments to packers.

DON'T KILL FLIES INSIDE!



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